Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Journal of Plastic, Reconstructive & Aesthetic Surgery (2021) 74, 1931–1971

JPRAS
An International Journal of Surgical Reconstruction
www.JPRASurg.com

Correspondence and Communications

Five year basal cell carcinoma recurrence rates treated with curettage and cautery, a single centre retrospective cohort study

Dear Sir,

Introduction

Basal cell carcinoma (BCC) is the most common skin cancer in the UK, accounting for 75% of all non-melanoma skin cancers, with around 75,000 new cases diagnosed annually.[1] BCCs are usually treated by surgical excision however, curettage and cautery (C&C) is a simple and inexpensive alternative surgical technique.[2]

European consensus guidelines on BCC treatment[3] reported a variation in 5-year recurrence rates using C&C between 3% and 20%. Our study investigates facial BCC lesions recurrence rate treated with C&C.

Recent guidelines[3, 4] have suggested caution in how C&C is applied and a study suggested the recurrence rate for surgical BCC excision may be lower.[5] However, some of the evidence suggesting a higher risk of post-operative recurrence with C&C alone is partly based on data collected more than 15 years ago.

Method

This retrospective cohort study was conducted in the department of Dermatology and Plastic Surgery at a regional acute UK hospital to investigate the BCC recurrence rate treated with curettage and cautery. Patients were treated by a Dermatologist or a Plastic Surgeon according to national guidelines with the choice of surgical intervention discussed and agreed with the patient as per standard clinical practice.

All data analysed were collected as part of routine diagnosis and treatment thus facilitating a retrospective review.

Data were collected using electronic patient records (EPR) from the Hospital Centre Histopathology database (Clinisys Winpath). The histopathology database between 2017 and 2018 was searched for patients who had C&C performed on BCCs between 2010 and 2012; a mixed team of dermatologists and plastic surgeons managed the patients. Histology reports were sub-divided into body sites: face high-risk, face low-risk, upper limbs, trunk, lower limbs; tumour sub-type was classified as superficial, nodular, morpheic, infiltrative, ulcerated or nodulocystic. Face high-risk was categorised as any BCC located around the eyes, on or around the nose, temples, upper forehead, or above the upper lip. Face low-risk was categorised as any BCC located on the cheeks, chin, or lower forehead; specimen size was also recorded.

Records were searched for evidence of recurrence within 5-years after surgery. Patients were included if there was evidence of hospital appointments or admissions within the 5-year timeframe. Patients who died were only included if there was confirmed recurrence within 5-years.

Results

155 BCC lesions from 133 patients with a median (range) age of 75 (31–103) were assessed with recurrence calculated from one lesion per patient; a patient was considered to have recurrence if occurring in at least one lesion. Overall there was a recurrence in 15 of 133 patients (11%); the age range of the non-recurrence and recurrence groups were similar (Table 1). One patient had recurrence in 2 of the 3 primary BCC sites, both of which were classified as face low-risk. One patient had recurrence in two lesions on the trunk. For lesions on the trunk there was recurrence in 2 of 17 patients (12%). For the Face low-risk group recurrence occurred in 6 of 43 (14%) patients which was a similar rate to 7 of 60 (12%) seen in the Face high-risk group. For those patients who had lesion recurrence the median (interquartile range) area of the Face low-risk original lesion was 64 (33–137)mm^2 and 50 (12 to 70)mm^2 for the Face high-risk lesions; for the trunk the areas of the two lesions were 35 and 240mm.^{2}

The median (range) age of patients in the face high-risk group with no recurrence was 79 (39–94) years and for the patients with recurrence was 56 (48–77) years. For the face low-risk lesion group the median (range) age of patients with no recurrence was 77 (41–94) years and for the patients with recurrence was 86 (71–103) years.

Discussion

Overall BCC recurrence of 11% for patients was seen in our study, consistent with previous reports.[4] The ages of patients with no recurrence in high and low risk face lesions

Table 1 Patient and lesion details together with characteristics for the non-recurrence and recurrence groups.

	Overall	No recurrence	recurrence
Number of patients	133	118	15
Median age (range)	75 (31 to 103)	76 (31 to 94)	72 (48 to 103)
M:F	68:65	59:59	9:6
Category			
Face high risk	60	53	7
Face low risk	43	37	6
Trunk	17	15	2
Upper limb	5	5	0
Lower limb	7	7	0
Neck	1	1	0
Histological reports			
BCC	28	24	4
Nodular BCC	71	62	9
Superficial BCC	7	7	0
Infiltrative BCC	5	5	0
Multicentric BCC	3	3	0
Multifocal BCC	2	1	1
Nodular and Infiltrative BCC	4	3	1
Nodulocystic BCC	1	1	0
Ulcerated BCC	6	6	0
Ulcerated Nodular BCC	4	4	0
Basosquamous Carcinoma	2	2	0

was similar in our study; however, the median age of the face low-risk patients who had lesion recurrence was 30 years higher than the face high-risk group.

There is currently no standardised technique for C&C which is suggested only for low risk primary BCC lesions[5]; various instruments are available[5] with a disposable ring curette with sharp and blunt edge being used for C&C in our centre. There is no consensus on how many cycles should be applied in a C&C session and recurrence may depend on the experience of the surgeon this can make comparison between studies difficult and may explain some of the variation seen.

Thus we observed a similar recurrence rate in low and high risk facial BCC lesions suggesting that the categorisation of low and high risk facial lesions should be reconsidered if curettage and cautery is used for treatment of BCC.

Funding

None.

Declaration of Competing Interest

None.

Ethical approval

Patients were treated according to national guidelines with the choice of surgical intervention discussed and agreed with the patient as per standard clinical practice. This study was approved by the department and data usage strictly adhered to the Caldicott principles. The paper does not report on primary research and all data analysed were collected as part of routine diagnosis and treatment thus facilitating a retrospective review.

References

1. Baxter JM, Varma S. Facial basal cell carcinoma. *Br Med J* 2012;**345**:e5342.
2. Lubeek SF, Arnold WP. A retrospective study on the effectiveness of curettage and electrodesiccation for clinically suspected primary nodular basal cell carcinoma. *Br J Dermatol* 2016;**175**(5):1097–8. doi:10.1111/bjd.14770.
3. Peris K, Fargnoli MC, Garbe C, et al. Diagnosis and treatment of basal cell carcinoma: European consensus-based interdisciplinary guidelines. *Eur J Cancer* Sep 2019;**118**:10–34 Epub 2019 Jul 6. doi:10.1016/j.ejca.2019.06.003.
4. Telfer NR, Colver GB, Morton CA. Guidelines for the management of basal cell carcinoma. *Br J Dermatol* 2008;**159**:35–48. doi:10.1111/j.1365-2133.2008.08666.x.
5. Thissen MR, Neumann MH, Schouten LJ. A systematic review of treatment modalities for primary basal cell carcinomas. *Arch Dermatol* 1999;**135**:1177–83.

Alberto Barea
Kingston Hospital NHS Foundation Trust, Galsworthy Road, Kingston upon Thames KT2 7QB, United Kingdom

Matthew Martinucci
Queen Elizabeth the Queen Mother Hospital, St Peter's Rd, Margate CT9 4AN, United Kingdom

David Wertheim
Kingston University, Penrhyn Road, Kingston upon Thames, Surrey KT1 2EE, United Kingdom

Isobel Florence India Morley, David Thomson, Mark George Soldin
Kingston Hospital NHS Foundation Trust, Galsworthy Road, Kingston upon Thames KT2 7QB, United Kingdom

https://doi.org/10.1016/j.bjps.2021.05.005

Universal ICG stage

Universal indocyanine green lymphography staging for extremity lymphedema

Dear Sir,

We read with great interest the article entitled "Correlation of ICG lymphography and lymphoscintigraphy severity stage in secondary upper limb lymphedema." by J.A. Yoon, et al. (J Plast Reconstr Aesthet Surg 2020; 73(11): 1982–8.). [1] Their work is of clinically significant importance for patients who suffer from secondary lymphedema, because they have elucidated strong correlationship between lymphoscintigraphy severity stage and arm dermal backflow (ADB) stage[2,3] on indocyanine green (ICG) lymphography. These two different modalities compensate each other and may lead correct diagnosis and severity assessment. Although the authors classified the cases according to ADB stage and modified MD Anderson Cancer Center (MDACC) stage, sometimes there are unclassifiable cases or error classification due to its ambiguity. To address this challenge, we developed and adopted a new modified DB, universal ICG stage, for severity staging of extremity lymphedema.[2-5]

ICG is injected subcutaneously in the several point of upper limb. At an early phase soon after injection, linear pattern is seen which shows lymphatic flows in the collecting lymph vessels. At around two hours after injection, DB patterns are seen in the arm. The new ICG stage is divided into six stages (stage 0, I, II, III, IV, and V) based on visibility of Linear pattern and extension of DB patterns (Table 1). Linear pattern is seen in stage 0-IV, whereas not seen in stage V. Splash pattern is seen in stage I in addition to Linear pattern. Stardust or Diffuse (SD) pattern is seen in stage II-V. SD pattern seen in one/two/three regions in stage II/III/IV, respectively; the upper/lower extremity is divided into the upper-arm/thigh, the forearm/lower-leg, and the hand/foot, respectively. Only SD pattern is seen in stage V.

Table 1 Universal ICG lymphography stage: modification of DB stages.

	ICG lymphography findings
Stage 0	Linear pattern only
Stage I	Linear pattern + Splash pattern*
Stage II	Linear pattern + Stardust pattern (1 region)**
Stage III	Linear pattern + Stardust pattern (2 regions)**
Stage IV	Linear pattern + Stardust pattern (3 regions)**
Stage V	Stardust and/or Diffuse pattern***

* Splash pattern is usually seen around the groin/axilla.
** Upper/lower extremity is divided into 3 regions; the upper-arm/thigh, the forearm/lower-leg, and the hand/foot.
*** Linear pattern is not seen.
DB, dermal backflow.
ICG, indocyanine green.

The patients with stage I to IV are indicated to take lymphovenous anastomosis (LVA) which is thought to be most effective treatment for upper limb lymphedema in these stages. Lymphedema in stage V has too severe sclerosis of lymph vessels to perform LVA.[3-5]

When using previous ADB stage or MDACC stage, there are some cases which can't be classified in any stages or which have different evaluation by each physician. There were several unclassifiable cases based on ADB stage or MDACC stage, which could be classified into the new ICG stage with 100% concordance rates among different examiners regardless of experience of ICG lymphography.[2,5] Although further studies are required to confirm efficacy, the new ICG stage can be a useful evaluation criteria of lymphedema severity.

Prior presentations

None.

Ethical approval

It is not applicable to this article.

Declaration of Competing Interest

None.

Acknowledgment

None.

References

1. Yoon JA, Shin MJ, Shin YB, et al. Correlation of ICG lymphography and lymphoscintigraphy severity stage in secondary upper limb lymphedema. *J Plast Reconstr Aesthet Surg* 2020;**73**(11):1982–8.
2. Yamamoto T, Yamamoto N, Doi K, et al. Indocyanine green-enhanced lymphography for upper extremity lymphedema: a novel severity staging system using dermal backflow patterns. *Plast Reconstr Surg* 2011;**128**(4):941–7.

3. Yamamoto T, Yamamoto N, Fuse Y, et al. Optimal sites for supermicrosurgical lymphaticovenular anastomosis: an analysis of lymphatic vessel detection rates on 840 surgical fields in lower extremity lymphedema. *Plast Reconstr Surg* 2018;**142**(6):924e-930e.
4. Yamamoto T. Onco-reconstructive supermicrosurgery. *Eur J Surg Oncol* 2019;**45**(7):1146-51.
5. Yamamoto T, Yamamoto N, Kageyama T, et al. Technical pearls in lymphatic supermicrosurgery. *Global Health Med* 2020;**2**(1):29-32.

Toko Miyazaki
Department of Medical Education, National Center for Global Health and Medicine, Tokyo, Japan

Takashi Kageyama
Department of Plastic and Reconstructive Surgery, National Center for Global Health and Medicine, Tokyo, Japan
E-mail address: kagetaka28@gmail.com (T. Kageyama)

https://doi.org/10.1016/j.bjps.2021.03.130

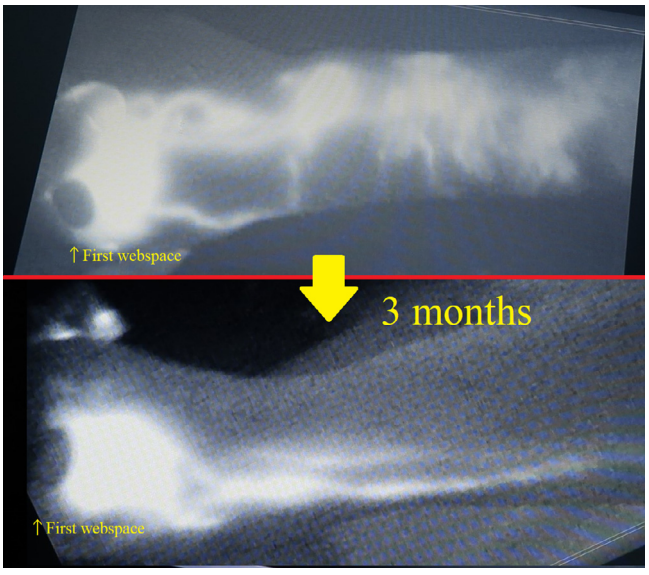


Figure 1 The findings of transient lymphatic dysfunction on indocyanine green lymphography
In the right forearm region, splash pattern was observed for the patient who undergo sentinel node biopsy before 6 months. After 3 months, this returned to normal and was diagnosed with a transient lymphatic dysfunction.

Universal ICG stage

Lymphatic dysfunction on indocyanine green lymphography in breast cancer patients undergoing sentinel lymph node biopsy

Dear Sir,

The reported incidence of Breast Cancer-Related Lymphedema (BCRL) after Sentinel Node Biopsy (SNB) is 0-7%.[1] Patients who undergo SNB may exhibit transient lymphatic dysfunction on Indocyanine Green (ICG) lymphography, which typically resolves over time (Figure 1). Goldberg et al. found no correlation between the number of resected lymph nodes and the change in upper extremity circumference.[2] However, in their study, the diagnosis of BCRL was based solely on circumference difference. Moreover, they mentioned that early lymphedema was not always permanent, and they may have failed to capture some transient episodes of lymphedema. The purpose of this study was to identify the risk factors for lymphatic dysfunction using ICG lymphography in patients undergoing SNB.

Due to changes in these findings in the short-term, we investigated these patients at defined time points over a year. Periodic patient evaluation was performed with ICG lymphography (before surgery and at 1, 3, 6, 9, and 12 months postoperatively). ICG (0.3 mL) was injected subcutaneously into the first webspace over the dorsum of the affected hand. One hour after the injection, circumferential fluorescent images of the lymphatic drainage channels were obtained using a photodynamic eye infrared camera (Hamamatsu Photonics K.K., Hamamatsu, Japan).

ICG lymphography images were classified based on the following patterns: linear, collateral, dermal backflow (DBF; "splash," "stardust," and "diffuse"), and "no flow." Collateral pattern was defined when the lymphatic route was not the same route observed on preoperative ICG lymphography and it was not accompanied with DBF. According to our previous study,[3] splash pattern was mild lymphatic dysfunction and could improve spontaneously. In contrast, stardust and diffuse patterns were more severe and could not improve. We have previously reported[4] on the "no flow" pattern observed on ICG lymphography wherein the dye does not flow beyond the wrist and no linear or DBF pattern is observed in the arm. As the "no flow" pattern is attributable to transient interstitial edema (induced by chemotherapy), changes in this pattern were usually observed over a short period. A linear pattern was considered indicative of normal lymphatic function. Collateral, DBF, and no flow patterns were considered indicative of lymphatic dysfunction. After 12 months postoperatively, ICG lymphography was performed only in patients with symptoms suggestive of lymphatic dysfunction.

We evaluated the use of measuring tape for estimation of the limb volume. All measurements were obtained at the following locations in both upper limbs: around the wrist, 10 cm distal to the elbow, around the elbow, and 10 cm proximal to the elbow. A difference of $>$ 5.0% between the

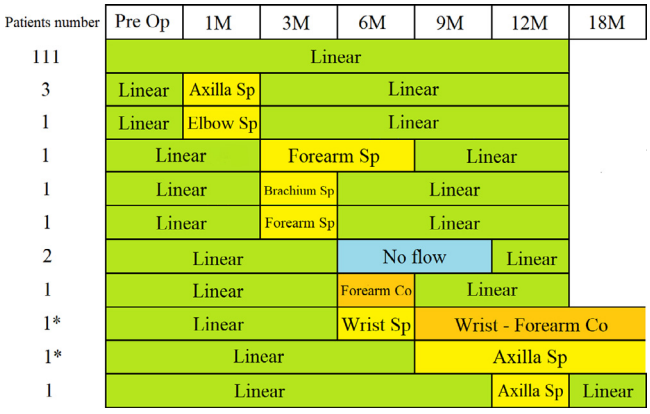


Figure 2 Postoperative changes of lymphatic function in 124 upper limbs for which lymphatic function was normal before surgery.
The abnormal findings were resolved at 12 months postoperatively in 10 patients and at 18 months postoperatively in one patient. Two patients (1.6%) were finally diagnosed with prolonged lymphatic dysfunction (*).
Pre Op, preoperative
M, month
Sp, splash pattern
Co, collateral pattern

affected and unaffected limbs was considered clinically significant.

Patients were divided into two groups: normal lymphatic function and lymphatic dysfunction. The following variables were compared between the two groups: age, body mass index, number of resected lymph nodes, surgery type (breast conserving surgery or mastectomy), history of hormone therapy (estrogen receptor agonist, aromatase inhibitor, or luteinizing hormone-releasing hormone agonist), and type of chemotherapy (taxane or non-taxane-based).

Lymphatic dysfunction was identified in 13 out of 124 patients (10.5%) until 12 months postoperatively. In the dysfunction group, the mean number of resected lymph nodes was significantly greater (4.1, range 2–8, versus 2.1, range 1–9; $p < 0.001$) and taxane-based chemotherapy rate tended to be higher (38.5% versus 15.3%, $p = 0.054$). There were no significant between-group differences with respect to other variables.

The following patterns were observed on ICG lymphography in the lymphatic dysfunction group: transient splash pattern, 8 patients; no flow pattern, 2 patients; transient collateral pattern, 1 patient; prolonged collateral pattern, 1 patient; and prolonged splash pattern, 1 patient. The abnormal findings were resolved at 12 months postoperatively in 10 patients and at 18 months postoperatively in one patient. None of the 13 patients showed significant circumference difference after 12 months postoperatively. Therefore, two patients (1.6%) were finally diagnosed with prolonged lymphatic dysfunction (Figure 2).

Lymphatic dysfunction experienced by patients is consistent with the concept of sub-clinical lymphedema that is characterized by impaired lymphatic function not leading to overt clinical symptoms.[5] The patients who showed splash patterns on ICG lymphography could develop stardust patterns and experienced symptomatic lymphedema at a significantly higher rate than those who did not.[5] We had previously reported that lymphaticovenular anastomosis (LVA) can help improve lymphatic function in these patients.[5] It appears that the patient with prolonged axillary splash pattern in this study may benefit from LVA.

Some limitations of our study should be acknowledged. As ICG was injected in only the first webspace, the potential effect on the other lymphatic pathways was not elucidated. Moreover, patients with no edema, but who may have developed DBF pattern after 12 months postoperatively were possibly excluded.

Funding

None

Ethical approval

Not required

Declaration of Competing Interest

None declared

References

1. McLaughlin SA, Wright MJ, Van Zee KJ, et al. Prevalence of lymphedema in women with breast cancer 5 years after sentinel lymph node biopsy or axillary dissection: objective measurements. *J Clin Oncol* 2008;**26**(32):5213–19.
2. Goldberg JI, Wiechmann LI, Van Zee KJ, et al. Morbidity of sentinel node biopsy in breast cancer: the relationship between the number of excised lymph nodes and lymphedema. *Ann Surg Oncol* 2010;**17**(12):3278–86.
3. Akita S, Nakamura R, Satoh K, et al. Early detection of lymphatic disorder and treatment for lymphedema following breast cancer. *Plast Reconstr Surg* Aug 2016;**138**(2):192–202.
4. Tokumoto H, Akita S, Mitsukawa N, et al. No flow pattern on indocyanine green lymphography in breast cancer patients undergoing taxane-based chemotherapy. *J Plast Reconstr Aesthet Surg* 2020;**73**(8):1575–92.
5. Akita S, Mitsukawa N, Satoh K, et al. Suitable therapy options for sub-clinical and early-stage lymphoedema patients. *J Plast Reconstr Aesthet Surg* 2014;**67**(4):520–5.

Hideki Tokumoto
Department of Plastic and Reconstructive Surgery, Chiba Cancer Center Hospital, 666-2 Nitona, Chuo-ku, Chiba City, Chiba 260-8717, Japan

Shinsuke Akita
Department of Plastic, Reconstructive and Aesthetic Surgery, Chiba University, Faculty of Medicine, 666-2 Nitona, Chuo-ku, Chiba City, Chiba 260-8717, Japan

Rikiya Nakamura, Naohito Yamamoto
Department of Breast Surgery, Chiba Cancer Center Hospital, 666-2 Nitona, Chuo-ku, Chiba City, Chiba 260-8717, Japan

Yoshitaka Kubota, Nobuyuki Mitsukawa
Department of Plastic, Reconstructive and Aesthetic Surgery, Chiba University, Faculty of Medicine, 666-2 Nitona, Chuo-ku, Chiba City, Chiba 260-8717, Japan
E-mail address: tokumoto0414@yahoo.co.jp (H. Tokumoto)

https://doi.org/10.1016/j.bjps.2021.05.029

Universal ICG stage

Indications and Pitfalls of Prepectoral Breast Reconstruction with Braxon® Acellular Dermal Matrix (ADM): A preliminary plastic surgical experience

Dear Sir,

Prepectoral breast reconstruction by total implant coverage using Braxon® (Decomed SrL, Venezia, Italy) porcine Acellular Dermal Matrix (ADM) is a novel technique designed to minimize the drawbacks of subpectoral implant-breast reconstruction, notably pain and animation deformity (Figure 1).[1] Although increasingly adopted by UK oncoplastic breast surgeons (Association of Breast Surgery - personal communication), the role of prepectoral breast reconstruction per se has yet to be defined especially in practices offering the full spectrum of breast reconstructions. A review of the indications and patient outcomes for Braxon® total implant coverage in a plastic surgeon's reconstructive breast surgery practice (2016-2019, minimum of 12 months follow-up) was undertaken. Our technique for Braxon® preparation and implant wrapping prior to insertion into the prepectoral pocket is illustrated in an accompanying video **(Supplementary material 1)**. Patients were identified from the departmental prospective breast reconstruction register and data extracted from the hospital's electronic patient record system (Epic 2014, Wisconsin, USA).

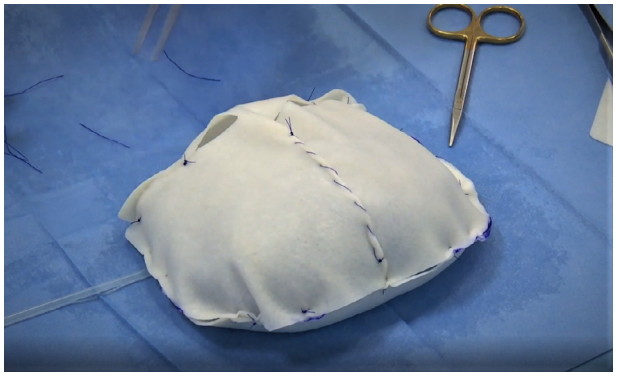


Figure 1 Total implant coverage using Braxon® Acellular Dermal Matrix as utilized in our practice. The photograph shows an expandable implant with a remote injection port entirely covered in Braxon® ADM sutured with 3-0 PDS and with the excess ADM trimmed off with scissors. The implant-ADM complex is shown here prior to insertion.

Braxon®-wrapped prepectoral reconstructions (22 breasts in 16 patients, 6 bilateral) comprised 12% of the surgeon's immediate breast reconstruction workload. Other reconstructions were three non-Braxon prepectoral and 39 subpectoral reconstructions, 63 DIEPs, 15 SIEAs, 11 bipedicled DIEPs (i.e., 22 hemi-DIEPs), 10 LD flaps, three PAP flaps, one TUG, one free TRAM, 14 therapeutic mammaplasties and 0 local perforator flaps. Table 1 includes patient demographics and indications for Braxon® reconstruction, demonstrating the wide range of applications for this technique. Most patients underwent nipple-sparing mastectomies (69%). The commonest implants used were anatomical fixed-volume prostheses. However, one third were permanent expanders (i.e., expandable implants) namely McGhan Style 150s (prior to the 2018 EU-wide ban) and subsequently Mentor Becker-35s. In general, expandable implants were used for breasts in which the nipples were sacrificed and constitute a type of direct-to-implant (DTI) technique as there is no planned expander-to-implant exchange. Acceptable cosmetic outcomes were achieved (**Supplementary material 2-4**). The mean follow-up from surgery to the last visit was 19 months (minimum 12 months).

Our early surgical outcomes showed a high reoperation rate of 37% and a 33% incidence of large seromas. As with other prepectoral reconstructions there were no documented breast animation deformities or reductions in arm movements in our series. No implant malrotations were observed (one patient had a transient left implant malposition which self-corrected). Whilst our complications rates are high, they are in keeping with other early experiences of prepectoral reconstruction with Braxon® ADM,[2] and may represent a learning curve. Adaptations in our technique, namely substituting the aqueous betadine pocket-irrigation solution with a gentamicin-saline mixture after ADM hydration and prior to implantation appears to have reduced seroma formation, although our patient numbers are insufficient for a meaningful comparison. Similar to other porcine ADM studies, two patients (three breasts) with "Red Breast" symptoms were admitted for IV antibiotics and non-steroidal anti-inflammatories as per current literature recommendations.[3] With hindsight, readmitting these patients was probably unnecessary in the absence of raised inflammatory markers and this would have reduced the high readmission rate to about one third (6/16). Furthermore, the complications were not all technique-related. Haematomas can occur regardless of implant pocket or ADM type and the Braxon® was not responsible for a patient developing a uro-sepsis which led to bilateral implant infection and explantation. Despite these ADM-unrelated events, large sero-

Table 1 Patient demographics, indications for prepectoral over subpectoral reconstruction and complication profile.

PARAMETER	PATIENT
Total patient number	16
Number of breasts	22 (6 bilateral)
Age at operation (years)	43.5 (range 35–55)
BMI at operation (kg/m^2)	25.9 (range 21.7–50)
Indication (by number of breasts)	**Number of breasts**
Cancer	10
Risk-reducing mastectomy	10
Tertiary (salvage) reconstruction	2
Indications for Prepectoral rather than Subpectoral Reconstruction	**Number of patients**
Active mother wishing to lift children early post-operatively	3
Athlete who needed reduced recovery time	2
Co-morbidities which excluded them from major surgery	2
Desire to minimise operation time and recovery	2
Insufficient fat coverage and bilateral reconstruction	2
Temporising measure before future DIEP surgery	2
Hyperactive pectoralis major muscles	1
Previous complex reconstruction	1
Young patient (allowing for further treatment options if required in the future)	1
Mastectomy type (by breast number)	**Number of breasts**
Skin-sparing, nipple-sparing	14
Skin-sparing, nipple sacrifice	4
Skin-reducing, nipple-sparing	2
Skin-reducing, nipple sacrifice	2
Mastectomy incision type (by breast number)	**Number of breasts**
Peri-areolar incision	15
Inframammary incision	5
Hemi-Y incision	4
Wise pattern	3
Mastectomy weight (mean)	359g (range 104-2045)
Implant type	**Number of breasts**
Fixed volume	15
Permanent expander	9
• McGhan Style 150s	6
• Mentor Becker-35s	3
Mean hospital stay (in days)	4.6 (range 2–7)
Mean time to drain removal (in days)	7.9 (range 3–25)
COMPLICATION	
Uneventful healing (patients, breast number)	7 (11 breasts)
Unplanned re-admission	8 patients (6 returned to theatre)
Return to theatre (1 hematoma, 3 seromas, 3 infections, 1 nipple problems)	6 patients (2 required 2 operations)
Major Adverse Outcomes (by number of breasts) *	**Number of breasts**
Explantation (implant loss)	6 (27%)
Seromas requiring aspiration	8 (36%)
Infection (including implant loss)	6 (27%)
Partial nipple necrosis- reconstruction salvaged Supplementary material 4	1 (4.5%)
“Red Breast”	3 (14%)
Haematoma	1 (4.5%)
Minor Adverse Outcomes (by number of breasts)	**Number of breasts**
Transient localised tenderness at superior fixation points	3 (13%)
Exercise-induced "partial dislodging”	1 (4.5%)
Transient implant malposition	1 (4.5%)
Visible rippling (not requiring fat grafting thus far)	4 (18%)

(*continued on next page*)

Table 1 (*continued*)

PARAMETER	PATIENT
Individual patient co-morbidities (by patient number)	**Complication developed by patient**
Uro-sepsis during admission (1)	Bilateral seromas with implant loss
Smoker (1)	No complications
Former smoker (2)	1 infection & bilateral implant loss
Ventricular septal defect & Factor VII deficiency (1)	Infection leading to implant loss
ACA embolic stroke (1)	Seroma needing aspiration
Depression, rheumatoid arthritis, Hepatitis C (1)	No complications
Cerebrovascular accident, patent foramen ovale (1)	No complications
Embolic stroke (1)	Cellulitis & Red Breast

*There was an overlap in these complications for instance some patients developed major seromas which led to readmission, re-exploration and implant loss. Similarly the haematoma patient develop infection of both breasts and these were explanted. The readmissions included the 2 patients with Red Breasts (3) who were readmitted out of an abundance of caution.

mas occurred in several patients (33%) and this might be related to this ADM's porcine constitution (Braxon is a pre-shaped freeze-dried porcine ADM) similar to what is seen with another popular porcine product, Strattice® (Allergan Plc, Dublin, Ireland).[4]

In our single-plastic surgeon's series, several factors may have contributed to the adverse outcomes observed. The complications encountered allowed us to develop an initial list of indications both for and against offering Braxon®-ADM reconstruction (Supplementary material 5). We have identified some pitfalls and relative contra-indications for this procedure (Table 1), and as with all types of reconstructions, careful patient selection is mandatory to achieving low complication rates. Inherent disadvantages of prepectoral breast reconstructions include implant visibility, rippling and empty superior take-off due to the more superficial implant placement although these can be largely mitigated with the subsequent use of fat grafting. Currently surgeons who exclusively adopt this strategy always factor in a second stage fat grafting operation for all patients, committing them to yet another operation, which in our opinion could be avoided in many such patients by performing subpectoral reconstruction instead.

In conclusion we feel that this technique should be applied with careful patient selection such as those with favourable soft tissue cover, no planned post-mastectomy radiotherapy, non-smokers and a clear/specific indication (as shown in **Supplementary material 5**). It is, therefore, not a panacea for all patients undergoing prosthetic reconstructions. Large-scale longitudinal studies are needed to determine the place of this surgical technique in current breast reconstructive practice.

Ethical approval

The project was registered as a hospital audit.

Declaration of Competing Interest

The senior author (CMM) had his travel expenses reimbursed for lecturing at two Braxon® symposia organized by Raise Healthcare UK for no remuneration. He also received one-off honoraria for serving on the Medical Advisory Panels of Allergan (the then manufacturers of McGhan Style 150 expanders) and Johnson & Johnson (the owners of Mentor Medical Systems who produce the Becker-35 expanders).

Funding

None.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2021.03.124.

References

1. Berna G, Cawthorn SJ, Papaccio G, Balestrieri N. Evaluation of a novel breast reconstruction technique using the Braxon® acellular dermal matrix: a new muscle-sparing breast reconstruction. *ANZ J Surg* 2017;**87**:493–8.
2. Jafferbhoy S, et al. Early multicentre experience of pre-pectoral implant based immediate breast reconstruction using Braxon®. *Gland Surg* 2017;**6**:682–8.
3. Citron I, Dower R, Ho-Asjoe M. Protocol for the prevention and management of complications related to ADM implant-based breast reconstructions. *GMS Interdiscip Plast Reconstr Surg DGPW* 2016;**5** Doc06.
4. Ball JF, et al. A direct comparison of porcine (StratticeTM) and bovine (SurgimendTM) acellular dermal matrices in implant-based immediate breast reconstruction. *J Plast Reconstr Aesthetic Surg* 2017;**70**:1076–82.

C. Bojanic, A. Lawrence, S. Mitrasinovic, S. Samaras, L.J. Fopp
Department of Plastic & Reconstructive Surgery, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, England, United Kingdom

P. Forouhi
Cambridge Breast Unit, Department of Surgery, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, England, United Kingdom

C.M. Malata*
Department of Plastic & Reconstructive Surgery, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, England, United Kingdom
Cambridge Breast Unit, Department of Surgery, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, England, United Kingdom
School of Medicine, Anglia Ruskin University, Cambridge & Chelmsford, England, UK

*Corresponding author at: Plastic and Reconstructive Surgery Department, Addenbrooke's Hospital, Box 186, Cambridge University Hospitals NHS Foundation Trust, Hills Road, Cambridge CB2 2QQ, UK.
E-mail address: cmalata@hotmail.com (C.M. Malata)

https://doi.org/10.1016/j.bjps.2021.03.124

Universal ICG stage

Fleur-de-lys abdominal body contouring surgery following massive weight loss.

Dear Sir,

We read with great interest the manuscript entitled "Safety of fleur-de-lys abdominoplasty after massive weight loss" by DeSerres et al.[1] We would like to congratulate the authors on their work on the abdominal sequelae of massive weight loss (MWL) patients exhibiting excess tissue and skin laxity in both the transverse and vertical dimensions. Unlike the fleur-de-lys (FDL) procedure, traditional abdominoplasty does not correct deformities that extend to both axes, as highlighted by the authors. We would like to discuss certain points that the authors raise, based on our experience and previous research. These may aid future studies.

First, in MWL patients, skin laxity and tissue excess are indeed evident in both the transverse and vertical abdominal axes, but these are also circular in nature. Thus, a circumferential reconstruction is usually necessary; lower bodylift procedures may be more appropriate than abdominoplasty.

Many studies have described the risk factors for complications after abdominoplasty. However, the complication rates of conventional and FDL abdominoplasty have not been compared; nor have those of the abdominoplasty and bodylift that are often offered to patients in need. We are not convinced that such interventions (i.e., FDL abdominoplasty/bodylift) increase the risk for major complications compared to traditional abdominoplasty. However, we observe that plastic surgeons remain reluctant to offer these longer interventions that are in fact better suited to correction of the deformities observed after MWL.

Second, between April 2018 and February 2021, we performed 11 FDL abdominoplasties and 21 FDL bodylifts (Table 1), as chosen by the patients, of whom 93% were female of mean age 46.8 years. The mean initial BMI was 30.4 kg/m^2 and the mean change in BMI was 18.1 kg/m^2. The overall complication rate was 28%, broadly similar to that of the authors. We recorded one major complication (an infection) in the abdominoplasty group and eight minor complications (wound dehiscence) in the bodylift group. We found it notable that the two groups did not differ significantly in terms of preoperative data (overall $p = 0.416$; Table 2), particularly the BMI (29.5 vs. 30.8 kg/m^2; $p = 0.115$). Older

Table 1 Characteristics of the 32 patients.

Variable	Value	Range (min, max)
Age, yr	46.8	(24, 6)
Female sex, n (%)	30 (63%)	-
Abdominoplasty, n (%)	11 (34%)	-
Bodylift, n (%)	21 (66%)	-
Weight before MWL, kg	130.3	(78, 199)
Weight before surgery, kg	81.6	(57, 116)
Weight loss, kg	48.4	(0, 101)
Percentage of weight loss (%)	35%	(0%, 53%)
Pre-MWL BMI, kg/m^2	48.4	(26.7, 75.8)
Pre-surgical BMI, kg/m^2	30.4	(21.5, 43.8)
ASA Score, n (%)		
1	3 (10%)	-
2	26 (81%)	-
3	3 (10%)	-
Operative time, min	159.7	(76, 290)
History of bariatric surgery, n (%)	29 (90%)	-
Complications, n (%)	9 (28%)	-

Table 2 Statistical analysis.

	FDL abdominoplasty	FDL bodylift	p
n	11	21	
Age (mean±SD)	50.5 ± 11	44.9 ± 11.5	0.258*
BMI (mean±SD)	29.5 ± 2.9	30.8 ± 5.8	0.416*
Complications (n;%)	1 (9%)	8 (38%)	0.115**

* Non parametric Mann-Whitney test.
** Fisher's exact test.

patients tended to choose the simpler and faster procedure; the abdominoplasty group was somewhat older than the bodylift group (50.5 vs. 44.9 years, $p = 0.258$), although statistical significance was not attained.

As also found by the authors, most complications were small dehiscences. However, we encountered no vertical and no "T-junction" dehiscence. This may reflect our surgical technique; we preoperatively mark the T-junction 2 cm under the umbilicus. In our opinion, this greatly reduces skin tension at the end of the procedure, and thus wound dehiscence.

Third, the authors found that the incidence of minor complications increased as more concurrent procedures were performed. This is in line with the findings of a recent review that compared abdominoplasty alone to both abdominoplasty and breast surgery; the complication rate was higher in the latter group.[2] The valuable prospective study of Winocour,[3] found that combined procedures increased the complication risk in multivariate analyses (relative risk = 1.5).

In conclusion, we fully agree with the authors: FDL abdominoplasty is feasible and safe. Complications are not uncommon after abdominal, MWL, body-contouring reconstruction, but most are minor, easily managed in outpatient settings, and do not compromise either patient satisfaction or the quality of life. We thank the authors for their contribution to post-bariatric surgery reconstruction, and for improving our knowledge of factors predictive of postoperative complications. We believe that plastic surgeons must make greater efforts to help the complex subpopulation that requires reconstruction.

Ethical statement

All clinical investigations adhered to all relevant tenets of the Declaration of Helsinki and were approved by our Committee for the Protection of Persons (CPP).

Declaration of Competing Interest

No author has no financial interest to declare. No specific funding was received in the context of this communication.

References

1. DeSerres J, Quaife T, Morzycki A, Curran M, Toy J. Safety of fleur-de-lis abdominoplasty after massive weight loss. *J Plast, Reconstr & Aesth Surg* 2021:223–43 Jan; 74(1) Pages.
2. Michot A, Alet JM, Pélissier P, Grolleau-Raoux JL, Bodin F, Chaput B. Morbidity in combined-procedure associating abdominoplasty and breast surgery: a systematic review. *Ann Chir Plast Esthet* 2015. doi:10.1016/j.anplas.2015.07.009.
3. Winocour J, Gupta V, Ramirez JR, Shack RB, Grotting JC, Higdon KK. Abdominoplasty: risk factors, complication rates, and safety of combined procedures. *Plast Reconstr Surg* 2015;**136**(5):597e–606e Nov.

Yanis Berkane*, François Saget
Department of Plastic, Reconstructive and Aesthetic Surgery, Hospital Sud, University of Rennes 1, Rennes, France

Silvia Gandolfi
Department of Plastic, Reconstructive and Aesthetic Surgery, CHU Rouen, Rouen, France

Théodoros Chrelias
Department of Plastic, Reconstructive and Aesthetic Surgery, Hospital Sud, University of Rennes 1, Rennes, France

Eric Watier, Nicolas Bertheuil
Department of Plastic, Reconstructive and Aesthetic Surgery, Hospital Sud, University of Rennes 1, Rennes, France
INSERM U1236, University of Rennes 1, Rennes, France
SITI Laboratory, Rennes University Hospital, Rennes, France

*Corresponding author.
E-mail address: yanis.berkane@live.fr (Y. Berkane)

https://doi.org/10.1016/j.bjps.2021.05.032

Universal ICG stage

Fox eye surgery: Who we cut when we pick up the knife

Dear Sir,

On March 16, 2021, eight people, including six Asian women, were murdered by a shooter who cited his "sexual addiction" as a reason for deliberately targeting Asian-owned massage parlors[1]. This horrific episode is yet another manifestation of a long history of marginalization and sexualization against Asian American and Pacific Islander (AAPI) women dating back to the Page Act of 1875, which banned Asian women, painted as prostitutes and laborers, from entering the United States. Stereotypes of Asian women as "exotic" continue to pervade the U.S. beauty industry, contributing to the recent resurgence of the "fox eye" amongst Western social media influencers. [2] Designed to create Asian-appearing almond-shaped eyes, fox eye surgery was first performed by plastic surgeon Dr. Robert Flowers more than 50 years ago. The current adaptation of this procedure involves a variable combination of blepharoplasty, canthopexy, canthoplasty, and brow lift.

As we mourn the tragedy in Atlanta, we AAPI women and allies in the field of plastic surgery reflect on the role aesthetic surgeons may have in perpetuating the exoticization of ethnic features, such as Asian eyes. What are the unintended costs of co-opting "exotic" features from racial minorities on those populations? While fox eye surgery may be provided in the absence of a full understanding of its current and historical context, aesthetic surgeons should be aware that such procedures can perpetuate potentially harmful standards of beauty.

Fox eye surgery has drawn abundant criticism from Asian women in mainstream and social media, who have expressed that the increasing appropriation of a historically criticized Asian feature has been hurtful and disheartening. [2] Several high-profile Asian surgeons including plastic surgeon Dr. Gabriel Chiu have publicly refused to perform fox eye surgery in an effort to combat racism against the AAPI community. [3] Stating that the adoption of the fox eye is an act of admiration holds little comfort for the AAPI community, the members of which often experience discrimination and harassment because of the shape of their eyes. [2] When Asian women are repeatedly told that their features are unappealing or undesirable, what they are really taught is that in order to assimilate into Western culture, they must disavow the traits with which they were born. This self-internalization of Western beauty ideals and the desire to distance themselves from negative racial stereotypes even drives some AAPI people to seek out blepharoplasty to surgically create a superior palpebral fold or "double eyelid." The emulation of Asian facial features has thus become a painful double standard: those born with almond-shaped eyes are negatively stereotyped while those who choose to obtain them are admired as trendsetters. "Fox eye" surgery may be one more way through which we reap what our wider society has sowed: the insidious silencing of AAPI voices resulting in depersonalization of and violence against our Asian daughters, sisters, mothers, and friends.

Aesthetic surgeons have a unique opportunity to act as allies who amplify Asian viewpoints by serving as gatekeepers for culturally "woke" approaches to aesthetic procedures. For example, cosmetic surgeons in Malaysia selectively facilitate the spread of transnational beauty ideals and actively eliminate harmful norms. [4] Per the American Society of Plastic Surgeons Code of Ethics, the responsibility of a plastic surgeon extends "...not only to the patient, but also to society." [5] Aesthetic surgeons' duty to individual patients is one reason surgical trends reflect mainstream beauty standards. However, surgeons' societal duty should also prompt them to address racial norms related to appearance which may contribute to widespread injustice, even when the patients requesting the procedure are not directly harmed. Just as surgeons consider procedural indications and contraindications, so too should they consider ethical, racial, and cultural implications on individual patients and members of society. An example of improving cultural sensitivity is applying similar rigour to the informed consent processes for fox eye surgery in non-Asians as those implemented around blepharoplasty in Asian women. Currently, fox eye surgery is portrayed by mainstream media as quick, inexpensive, and harmless. This is in stark contrast to the exploration of patients' complex motivations and expectations regarding their appearance that often accompanies candidate screening for blepharoplasty. Differential implementation of these processes can be a result of implicit or structural bias which further supports the ability of the majority to set beauty standards.

This discussion comprises but one component of a broader conversation regarding plastic surgeons' roles in combating structural racism and sexism in their speciality. In a time of racial reckoning, medicine must adapt alongside the conversations occurring in our communities. Given that plastic surgeons are consistently at the forefront of innovation, the same should hold true in adapting to evolving societal norms. The field will show its mettle in how it responds and changes the narrative around procedures exposed as potentially harmful to millions of members of our global community.

Disclosures

Ms. He, Khoo, and Cooney and Dr. Broderick have no conflicts of interest or relevant funding disclosures.

Ethical approval

N/A

Author roles

All authors have made substantial contributions to conception and design, helped draft or revise the article critically for important intellectual content; approved the final version of the article to be published; and agreed to be accountable regarding accuracy or integrity of the article.

References

1. Uyehara M. *The roots of the Atlanta shooting go back to the first law restricting immigration*. The Nation; 2021. March.
2. McMeekin S. *Here's exactly why the fox eye trend is racist*. Beauty Crew; 2021.
3. Yaptango A. *Racism against the AAPI community is a beauty industry problem*. Elle; 2021. March https://www.elle.com/beauty/a35853879/beauty-industry-racism-aapi-community/ .
4. Menon A V. Cultural gatekeeping in cosmetic surgery: transnational beauty ideals in multicultural Malaysia. *Poetics* 2019;**75**(March):101354. doi:10.1016/j.poetic.2019.02.005.
5. ASPS Ethics Committee. 2020 Code of ethics of the American society of plastic surgeons. https://www.plasticsurgery.org/documents/Governance/asps-code-of-ethics.pdf.

Waverley Y. He
Department of Plastic and Reconstructive Surgery, Johns Hopkins University School of Medicine, Baltimore, MD, United States

Kimberly H. Khoo
Department of Plastic and Reconstructive Surgery, Johns Hopkins University School of Medicine, Baltimore, MD, United States

Division of Plastic and Reconstructive Surgery, University of Texas Medical Branch at Galveston, Galveston, TX, United States

Kristen P. Broderick, Carisa M. Cooney
Department of Plastic and Reconstructive Surgery, Johns Hopkins University School of Medicine, Baltimore, MD, United States
E-mail address: whe12@jhmi.edu (W.Y. He)

https://doi.org/10.1016/j.bjps.2021.05.033

Universal ICG stage

Considering the view from the inside of the maxillary sinus in Le Fort II osteotomy

Dear Sir,

Background

The Le Fort II osteotomy is a relatively rare operation. Its indications are severe midfacial-nose hypoplasia with a skeletal class III malocclusion, which occurs due to trauma with nasomaxillary hypoplasia, syndromic midfacial anomalies like Apert and Pfeiffer, cleft lip and palate and Treacher-Collins syndrome, and so on. Many authors have successfully used a variety of Le Fort II osteotomies to advance the midface, and the procedures of Le Fort II osteotomy have previously been shown in detail in figures.[1,2] However, a down fracture might be required, because parts of the osteotomy line might often be left without cutting. The remaining part could be the posterior wall osteotomy of the maxillary sinus (MS), and the location might be difficult to show explicitly in figures. We thought that one could resolve this problem by considering the view from the inside of the MS in Le Fort osteotomy. This report aimed to illustrate this easy-to-use perspective for Le Fort II osteotomy.

Method

Simplifying extremely, the complicated shape of the MS is considered as one box. Inside the boxes, the osteotomy lines of Le Fort II osteotomy are drawn simply (Figure 1). All osteotomy lines of a Le Fort II osteotomy including the posterior wall can be directly seen when the anterior wall of the box is opened (Figure 2). A transmaxillary sinus approach (TSA), which we described previously, is a procedure that provides direct observation and cuts the posterior walls of the MS after removing the thin anterior walls of the MS.[3] Even for Le Fort II with impacted teeth, it could be comparatively easy to cut the posterior wall directly from inside the MS by opening the anterior wall (Figure 3). As a consequence, this procedure could basically not need a complete down fracture (Supplementary video 1).

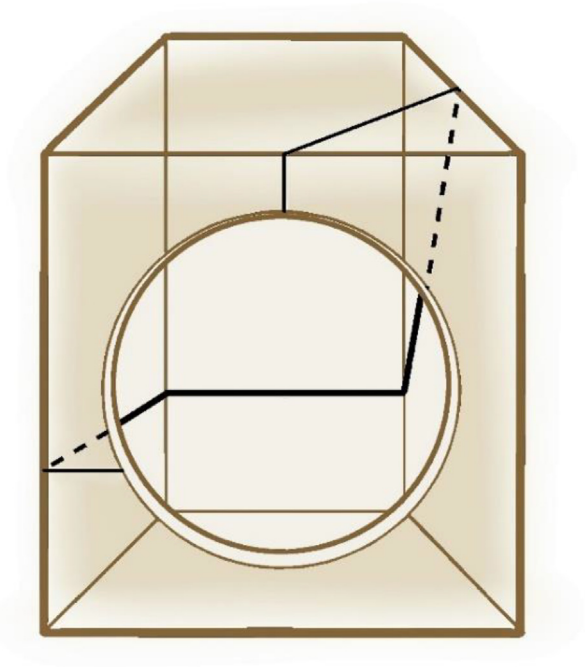


Figure 1 The osteotomy line of Le Fort II from the inside of the simplified maxillary sinus.

Figure 2 Illustration of the Le Fort II osteotomy including the TSA.

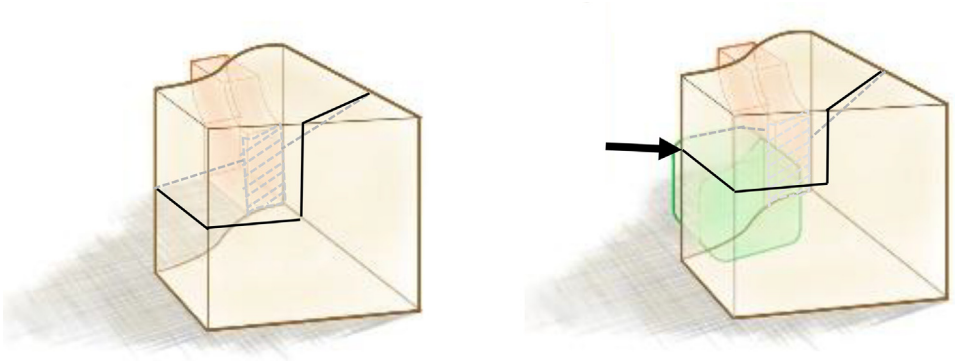


Figure 3 Left: Illustration of the Le Fort II osteotomy line in a simplified maxillary sinus without impacted teeth. Right: Illustration of the Le Fort II osteotomy line in a simplified maxillary sinus with impacted teeth. The lateral osteotomy line with impacted teeth is put at a higher level than without impacted teeth (black arrow) Impacted teeth (green), Pterygoid process of the sphenoid bone (orange).

Specifically, the thin anterior walls of the MS are removed to look inside the MS after the alveolar mucosa and the periosteum between the maxillary molar regions on both sides are gently removed by intraoral incision. Then, after only the mucosa of the osteotomy area in the MS has been gently removed on both sides, the posterior walls are cut by chisel under direct vision using light. The posterior osteotomy lines of the MS are joined to the medial osteotomy lines of the MS, which go through the nasal bone, and are also joined to the lateral osteotomy lines of the MS. The osteotomy of the pterygomaxillary junction is cut by a swan-neck or curved chisel. Therefore, this procedure does not need a complete down fracture with a Rowe forceps, though confirmation for mobilization or movement of the mid-face is needed.

On the other hand, the osteotomy of the nasal bone to the orbital region is cut in the frontonasal suture via a bicoronal or transglabellar approach. The lacrimal sac is protected, and a chisel is then used along the lacrimal fossa behind the posterior lacrimal crest (Supplementary video 2). The subconjunctival incision is used to expose the infraorbital rim when subperiosteal dissection of the infraorbital rim cannot be performed directly. The osteotomy lines of the lateral maxillary wall are extended posteriorly to the tuberosity and join the infraorbital cut at the anterosuperior region of the medial infraorbital rim. A nasal septal osteotomy is passed through the frontonasal horizontal cut and gently tapped obliquely toward the posterior palatal region, including the perpendicular plate of the ethmoid bone and the vomer bone down to the posterior nasal spine.

Cases

Case 1. A 10-year-old female patient with Apert syndrome (Figure 4).

The patient underwent a Le Fort II osteotomy with TSA because she had midfacial-nose hypoplasia with a skeletal class III malocclusion. When the nasomaxillary complex was totally freed from the bone attachment, a halo-type external distraction device (MEDICAL U&A, Osaka, Japan) was attached, and a total of 6 surgical wires (2 fixed to an internal distraction device, 2 fixed to the piriform aperture, and 2 fixed to the nasal bone) were attached to the external devices.[4] Two years after surgery, midfacial depression was improved, and the repaired morphology of the external nose was also improved.

Case 2. A 5-year-old female patient with Apert syndrome (Figure 5).

The patient underwent a Le Fort II osteotomy with TSA as in case 1. Three years after surgery postoperatively, the midfacial depression was improved, and her occlusion was also overcorrected.

Discussion

By considering the view from the inside of the MS, Le Fort II osteotomy can be easily performed because one can better understand the design of the osteotomy line with this easy-to-use approach. One of the difficult procedures is to cut the posterior wall of the MS for a Le Fort osteotomy.

It has been pointed out that unfavorable fractures through the pterygoid plates sometimes occur with this technique.[5] Such unfavorable fractures could be avoided by considering simplifying the shape of the MS and the TSA, which could cut the posterior wall of the MS directly and allow an easy procedure without down fracture. However, the TSA requires care to avoid vascular injury to the maxillary artery or pterygoid venous plexus from the penetration of the osteotome through the posterior wall, though this has not happened in our experience.

We have used TSA with distraction osteogenesis. A standard midface osteotomy fixed with bone plates simultaneously is needed, along with additional mobilization of the mid-face, though distraction osteogenesis would not be required.

Meanwhile, it might be difficult for Le Fort II osteotomy, as in Le Fort I osteotomy, to move the midface in the atypical cases with hyper/hypoplasia of the lateral pterygoid plates and a well-developed synostosis.[6]

Furthermore, the more difficult cases of Le Fort II osteotomy could include a case with impacted teeth in the posterior part of the MS. It is generally difficult to cut the posterior wall of the MS because there are some impacted teeth, such as the 6th, 7th, and 8th molar teeth. TSA could avoid these teeth and not cause direct damage by the pos-

Figure 4 A 10-year-old female patient with Apert syndrome. Left: Preoperative view. Middle: Frontal view showing that the transfacial pin (white dotted arrow) and the plates for fixing the wires of external devices (white arrows) in the MS (※) after the posterior walls are cut by a chisel under direct vision. Right: Two years after surgery.

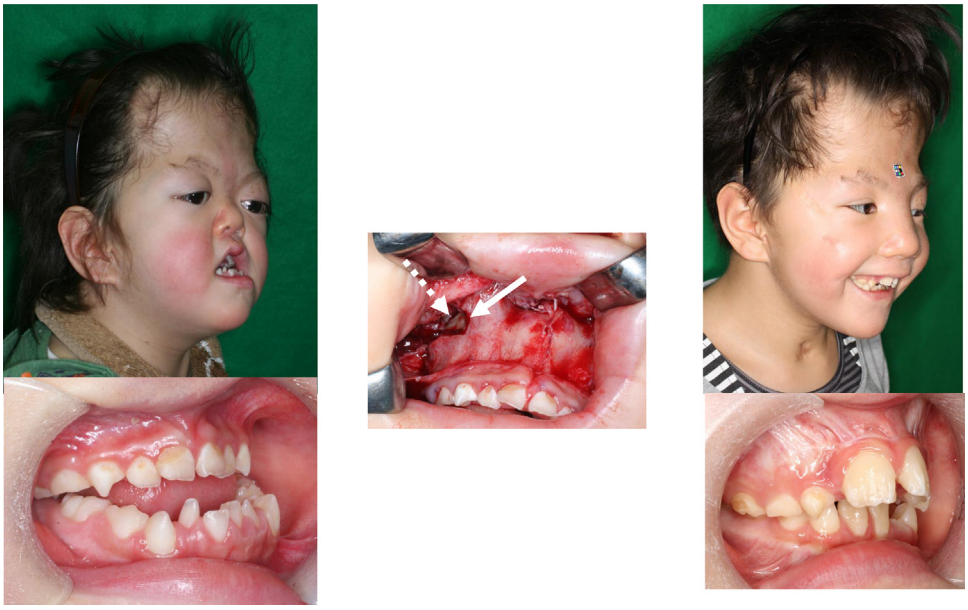


Figure 5 A 5-year-old female patient with Apert syndrome. Left: Preoperative view. Middle: Frontal view of the removal of the thin anterior walls of the MS (white arrows) and the osteotomy line (white dotted arrow) to look inside the MS. Right: Three years after surgery.

terior wall cut. However, impacted teeth might be damaged by the posterior wall cut and the lateral maxillary bone cut if the teeth are located in a higher position into the MS.

Nevertheless, the TSA could be performed with a short operative time and less bleeding. We believe that this idea could be useful for Le Fort II osteotomies.

Conclusions

Considering the view from the inside of the MS and the TSA is expected to make it easier to understand the design of the osteotomy line with this easy-to-use approach.

Supplementary video 1. The view from the inside of the TSA for the Le Fort II osteotomy

Declaration of Competing Interest

None declared.

Funding

None.

Ethical approval

This study was approved by Kanagawa Children's Medical Center's institutional review board (Approval number: 61-02). Informed consent from the patient's parents/guardians for undergoing the procedure and publishing images was obtained.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2021.03.129.

References

1. Freihofer HP. Latitude and limitation of midface movements. *Br J Oral Maxillofac Surg* 1984;**22**:393–412.
2. Steinhauser EW. Variations of Le Fort II osteotomies for correction of midfacial deformities. *J Maxillofac Surg* 1980;**8**:258–65.
3. Kobayashi S, Fukawa T, Hirakawa T, et al. Transmaxillary sinus approach for Le Fort II osteotomy. *Plast Reconstr Surg Glob Open* 2016;**10**:e619.
4. Kobayashi S, Fukawa T, Hirakawa T, et al. An osteogenesis distraction device enabling control of vertical direction for syndromic craniosynostosis. *Plast Reconstr Surg Glob Open* 2014;**6**:e113.
5. Trimble LD, Tideman H, Stoelinga PJ. A modification of the pterygoid plate separation in low-level maxillary osteotomies. *J Oral Maxillofac Surg* 1983;**41**:544–6.
6. Hoffman GR, Islam S. The difficult Le Fort I osteotomy and down-fracture: a review with consideration given to an atypical maxillary morphology. *J Plast Reconstr Aesthet Surg* 2008;**6**:1029–33.

Shinji Kobayashi
Department of Plastic and Reconstructive Surgery, Kanagawa Children's Medical Center, Mutsukawa 2-138-4, Minami-ku, Yokohama 232-8555, Kanagawa, Japan

Toshihiko Fukawa
Department of Plastic and Reconstructive Surgery, Kanagawa Children's Medical Center, Mutsukawa 2-138-4, Minami-ku, Yokohama 232-8555, Kanagawa, Japan
Fukawa Orthodontic Office, Japan

Toshihiko Satake, Jiro Maegawa
Department of Plastic and Reconstructive Surgery, Yokohama City University Hospital, Japan
E-mail address: skobayashi@kcmc.jp (S. Kobayashi)

https://doi.org/10.1016/j.bjps.2021.03.129

Universal ICG stage

A break from routine: Are we imaging too many fingertips?

Dear Sir,

I write in regard to the role of imaging in fingertips.

Background

Fingertip injuries are a common presentation in plastic surgery, comprising the majority of paediatric hand trauma, while nailbed injuries alone result in ~10,000 annual UK procedures.[1] Referrals to plastic/orthopaedic surgery are generally made following assessment in an emergency department, minor injuries unit, or urgent care centre. A routine radiograph is a standard of care, yet bony fixation of the distal phalanx is rarely undertaken. Obtaining and transferring imaging can cause delays within a busy department, results in exposure to an equivalent of 6h background radiation, and costs the NHS approximately half a million pounds annually.[2]

Question

The overall aim of this study is to determine the utility of routine radiographs in all patients with fingertip injuries (distal to the DIPJ[3]) and whether patient selection criteria may allow us to safely be more selective as to which patients with fingertip injuries undergo x-ray. The specific aim is to therefore assess the impact of x-ray on the management of these injuries.

Methods

A retrospective chart, photograph and radiology review was performed to assess paediatric and adult injuries of the distal phalanx (DP) at our unit over a three month period (November 2019 to January 2020). Complete amputations and closed injuries were excluded.

Results

There were 220 presentations with fingertip injuries, 71 paediatric (mean age 5.8, SD 4.0) and 149 adult (mean age 46.8, SD 17.0). 209 patients received x-rays, leading to 9 interventions on bony fractures, with an overall a ratio of 23:1 of non-impactful to impactful radiographs.

Of the 93% ($n = 66$) of children who underwent imaging, 50% ($n = 33$) had a fracture of the distal phalanx, of

which 82% ($n = 27$) were limited to the tuft. 3% ($n = 2$) of cases with an x-ray received an intervention - 1 manipulation for an open growth plate (Salter-Harris II) fracture, and 1 Kirschner-wire fixation for a physeal (Seymour) fracture.

Of the 96% ($n = 143$) of adults who underwent X-ray, 81% ($n = 116$) had distal phalanx fractures, of which 81% ($n = 94$) were tuft fractures. 5% ($n = 7$) required an intervention - 6 manipulations and reductions of open extra-articular distal phalanx fractures, and 1 immobilisation in Zimmer splint for an open longitudinal fracture.

Predictors of the need for intervention were assessed and results presented in Table 1:

	No intervention	Intervention	*P* value
Level of injury[4]			**0.01686**
Proximal to Lunula	47	7	
Lunula to distal ¼ nailbed	94	1	
Distal ¼ nailbed to tip	38	1	
Distal tip/pulp	18	0	
Haematoma (unobserved nailbed laceration)	14	0	
Type of injury			**0.34816**
Haematoma	19	0	
Infection	4	0	
Pulp/distal to nail laceration	46	0	
Nailbed laceration/proximal injury	117	7	
Partial amputation	25	2	
Mechanism of injury			**0.11985**
Crush	153	6	
Blunt	5	1	
Sharp	37	1	
Avulsion	13	0	
Bite	3	1	
State of nailplate			**0.06068**
In-situ	70	0	
Haematoma/loose	24	3	
Fragmented/<½ lost	17	1	
Avulsed/>½ lost	89	5	
Not present	11	0	

Discussion

The overall impact of fingertip x-rays is low, with imaging only influencing the management of 4.3% of patients with fingertip injuries (equivalent to approximately £1209 for every impactful result). Nevertheless, in cases where intervention occurred, finger radiographs were a critical step, which highlights the risk associated with missing these diagnoses.

X-ray imaging maintains a significant role in managing fingertip injuries to determine if there is bony injury requiring fixation, thorough washout, splinting, soft tissue manipulation, and/or closer follow-up. Indeed, obtaining x-rays in the Emergency Department remains the most logistically efficient point to do so. This raises the question as to whether selection criteria, easily applied by non-specialists before specialty referral, can be established to guide patient selection, improving the impact of x-ray imaging in fingertip injuries whilst not missing critical diagnoses. For context, rules to select patients for radiographs have been developed to improve impact of x-rays in other injuries such as ankle (Ottawa), knee (Pittsburg), and wrist (Amsterdam) - the Amsterdam wrist score has a 98% sensitivity for fractures whilst reducing radiograph requests by 10%.[5]

Our preliminary data suggests that injury proximal to the lunula and/or a clear external deformity may be associated with a higher likelihood of bony surgical intervention, though analysis of predictors was limited by the small sample size. Hence, similar to past efforts focused on other anatomical areas, further studies are required to identify clinical predictors of injuries meriting intervention in order to tailor our approach. Alternatively, there may be a role for low-risk diagnostic modalities such as point-of-care ultrasound.

We therefore propose that hand trauma units undertake an assessment of acute presentations of fingertip injuries to ascertain predictors of injuries requiring bony intervention. Further recommendations include a supplementary project highlighting the time taken to acquire radiographs in unit or via transfer. A large sample size is necessary to sufficiently power this; hence, it would be appropriate for proposal via the UK Reconstructive Surgery Trials Network (RSTN).

We appreciate the outcome may conversely suggest that, incidentally, routine imaging is safer overall. Nevertheless, by determining criteria to identify fingertip injuries in which imaging is likely to influence management, we can be more selective in which patients receive radiographs, and alleviate radiation exposure, time, logistical and cost pressures, ultimately improving service efficiency and effective patient care.

Kind Regards,

Ali M. Jawad

Fellow in Burns and Plastic Surgery Queen Victoria Hospital, East Grinstead.

Declarations of Competing Interest

There are no conflicts of interests to declare.

There is no ethical approval required.

This preliminary study has not received any funding.

References

1. Jain A, Jones A, Gardiner MD, Cooper C, Sierakowski A, Dritsaki M, Ping ME, Stokes JR, Shirkey B, Cook J, Beard D, Greig AVH. NINJA trial: should the nailplate be replaced or discarded after nail bed repair in children? Protocol for a multicentre randomised control trial. *BMJ Open* 2019;**9**:e031552.
2. N.H.S. EnglandNational tariff payment system non-mandatory prices 2019/20. *NHS Improv* 2019 C 01/19.

3. Tang JB, Elliot D, Adani R, Saint-Cyr M, Stang F. Repair and reconstruction of thumb and finger tip injuries:a global view. *Clin Plast Surg* 2014;**41**:259–325.
4. Allen MJ. Conservative management of finger tip injuries in adults. *Hand* 1980;**12**(3):257–65.
5. Walenkamp MMJ, Bentohami A, Slaar A, Beerekamp MSH, Maas M, Jager LC, Sosef NL, van Velde R, Ultee JM, Steyerberg EW, Goslings JC, Schep NWL. The Amsterdam wrist rules: the multicenter prospective derivation and external validation of a clinical decision rule for the use of radiography in acute wrist trauma. *BMC Musculoskelet Disord* 2015;**16**:389.

Ali M. Jawad
Isabelle Citron
Baljit S. Dheansa
Department of Plastic Surgery, Queen Victoria Hospital, East Grinstead, West Sussex, UK
E-mail address: amjawad14@doctors.org.uk (A.M. Jawad)

https://doi.org/10.1016/j.bjps.2021.05.041

Universal ICG stage

Development and validation of the instrument for scalping classification in the context of the Brazilian Amazon region

Dear Sir,

The scalp trauma caused by motor boats common in the Amazon region are challenging for health professionals. The treatment represents a challenge for the professionals, long, highly complex treatment that requires evaluation of the patient and lesion size, and an experienced surgeon. Some of the possible approaches involved in achieving skin coverage of the scalp are tissue expansion, skin grafts and flaps, and microsurgical replantation, when feasible.[1]

In addition to the challenges of patient treatment in all phases, another important difficulty experienced by the team is related to classifying the trauma; these professionals observe different degrees of injury in clinical practice, ranging from small parts of the scalp to more severe avulsions involving facial, neck and external ear mutilations.

Taking into account the range of anatomical tissues affected in the injury and the sequelae, we observed that the standard classification only as “partial” and “total” limits the understanding of the trauma and that it is extremely important to describe the degree of injury in terms of the skin, muscles, and bones affected, as well as to define the degree of the lesions and the affected areas, thus specifying the extent of the damage beyond the avulsion of the scalp.

The nonspecificity of the classification of scalping as only partial or total makes it difficult to delineate the sequelae and physical and psychological limitations that the individual may have, as well as the long-term treatment program required, in addition to hindering the creation of public policies involving the multiprofessional treatment of scalping patients. The present study aimed to develop and validate the Scalping Classification Scale per Affected Area (SCA).

This was a cross-sectional study approved by the University Research Ethics Committee (number 3.103.750), that developed and verified the reliability of the scale with two examiners in an interval of seven days (Supplement 1 and 2). To assess the scale, the examiners evaluated 33 female volunteers with traumatic avulsion of the scalp, coming from the Amazon region, with a mean age of 36.3 years ±14.3, with different levels of scalping, and had undergone finalized plastic reconstruction surgeries. Individuals were excluded if they were younger than 18 years, with skin lesions in the scalp, were using permanent hair prostheses or capillary implants.

Data analysis was performed using the SPSS version 21. The intraclass correlation coefficient (ICC) was used to determine intra- and inter-examiner reliability for the score given to the area affected and the percentage of affected area, using a confidence interval (CI) of 95%, standard error of measurement (SEM), and minimum detectable change (MDC).[2] The interpretation of the ICC was based on the study by Weir (2005).[3]

The percentage of agreement for the scalping degree classification was calculated by dividing the agreement observed by the total number of observations, indicating how identical the repeated measures were. The reliability for this classification were determined by Cohen’s Kappa coefficient, with a CI of 95%. The use of the test eliminates the effect of random agreement.[4] The interpretation of the Kappa coefficient was based on the study by Sim and Wright (2005).[5]

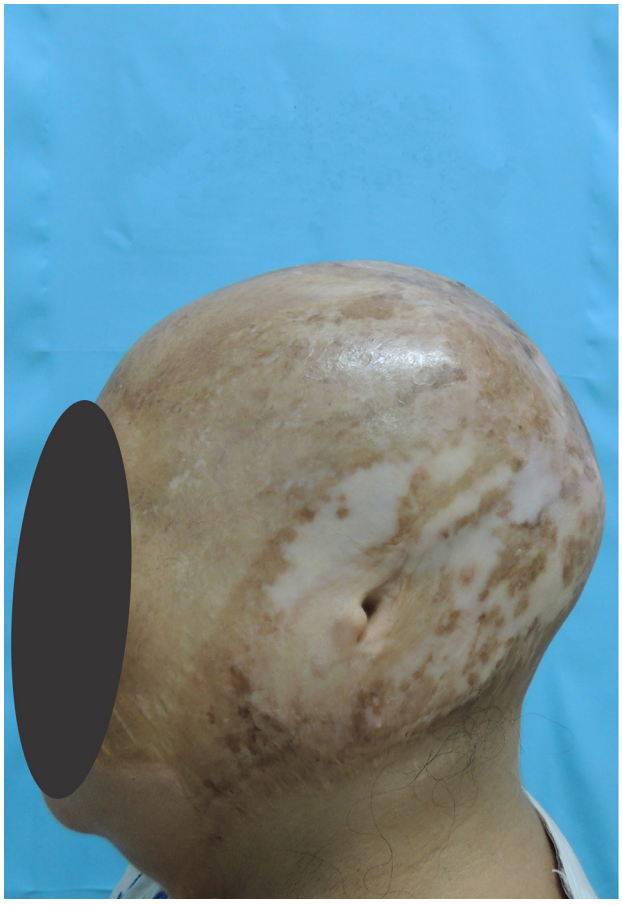
The proposed scale showed excellent reliability for the intra- and inter-rater, and the respective SEM and MDC (Table 1). The degrees assigned to scalping by Examiner 1 were observed in the test and retest, respectively: 11 (33.3%) and 10 (30.3%) for slight; 9 (27.3%) and 10 (30.3%) for moderate; 12 (36.4%) and 12 (36.4%) for severe; 1 (3.0%) and 1 (3.03%) for very severe; and for Examiner 2: 12 (36.4%) and 9 (27.3%) for slight; 9 (27.5%) to 10 (30.3%) for moderate; 10 (30.3%) and 11 (33.3%) for severe; 2 (6.1%) and 3 (9.1%) for very severe. For degree of scalping, excellent reliability (Kappa= 0.956) with a CI of 95% ranging from 0.869 to 1.00 was observed in the intra-examiner analysis and for the inter-examiner a substantial reliability (Kappa = 0.606) was observed with a CI of 95% ranging from 0.388 to 0.823. In Figure 1 it is possible to observe an example of the classification of scalping with SCA.

According to the methodology employed, the present study identified that the SCA is safe and applicable both intra- and inter-rater. This is a pioneer study into the development of a scale that aims to classify scalping at different levels of involvement, taking into account not only the involvement of the scalp, but also the adjacent tissues that can be torn during the accident.

Table 1 Intra and inter-examiner reliability of affected area and percentage of affected area.

Test	ICC	95% CI	SEM	MDC
Intra-examiner				
Area affected (score)	0.988	0.975 - 0.994	0.260	0.722
Percentage map of affected areas (%)	0.988	0.975 - 0.994	2.44	6.765
Inter-examiner				
Area Affected (score)	0.981	0.962 - 0.991	0.341	0.722
Percentage map of affected areas (%)	0.953	0.906 - 0.977	4.88	13.55

ICC: Intraclass correlation coefficient; CI: Confidence interval; SEM: Standard error of the mean; MDC: Minimum detectable change.



SCA
Scalping Classification Scale per Affected Area
Instructions

This scale was developed to assist in the classification of scalping and takes into account tissue lesions. At the time of the assessment, the individual must have his head without dressings, capillary prosthesis or any other material that makes it difficult to fully visualize the skull. The professional should observe all views of the head: anterior, right and left, posterior and upper. The degree of classification will be obtained by combining the **total of the areas affected (I)** and the **total percentage of affected areas (II)**. In case of divergence between the relationships, the sum of the percentage map (II) is considered as a determining factor for grade classification (III). After the two stages, the classification will be obtained: **mild, moderate, severe and very severe.**

I – Areas affected in scalping

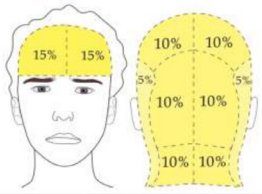
Draw a circle around the number (0, 1 or 2) to determine which **areas** were affected in scalping. Next, add up the scores and write the total below.

Affected areas	No	Right	Left
Eyebrow	0	1	1
Eyelid	0	1	1
Middle third of the face	0	1	1
Neck (skin and/or muscles)	0	1	1
Outer ear	0	2	2
Skin	0	2	2

Total score: _____

II – Percentage map of affected areas (%)

In this phase, mark **ONLY** the affected areas, starting from the skin in the frontal area to the neck. Next, add up the percentages and write the total below.



Total (%): _____

III – Degree of scalping

Mild	Total score of affected areas between **0 and 3;** Total of percentage map between **5% and 30%.**
Moderate	Total score of affected areas between **0 and 6;** Total of percentage map between **35% and 50%.**
Severe	Total score of affected areas between **0 and 9;** Total of percentage map between **55% and 80%.**
Very severe	Total score of affected areas between **10 and 16;** Total of percentage map between **80% and 100%.**

Fig. 1 Total avulsion of the scalp, involving facial, the external ear and nape mutilations, classified as Very Severe in the SCA.

The simple characterization of the scalping trauma as total or partial avulsion may contribute to the easy acceptance and use of the current classification, which also does not require knowledge of the structures of the head and their boundaries. In this sense, the SCA covers and takes into account the complexity and severity of scalping by encompassing facial structures such as eyebrows, eyelids, zygomas, nape and head skin, dividing the skull area in percentages according to their anatomical boundaries. Thus, it is possible to classify and stratify the severity levels of scalping in each individual, taking into account the extent of the affected area as a determining factor associated with regions of the face that were involved.

The SCA can be applied easily to the population studied and the results lead us to conclude that the instrument should be implemented in research and clinical practice because it is able to measure different degrees of scalping severity.

Financial disclosure statement

The authors have nothing to disclose. No funding was received for this article.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2021.05.036.

References

1. Dedhia R, Luu Q. Scalp reconstruction. *Curr Opin Otolaryngol Head Neck Surg* 2015;**23**(5):407–14.
2. Tucci HT, Martins J, Sposito G de C, Camarini PM, de Oliveira AS. Closed kinetic chain upper extremity stability test (CKCUES test): a reliability study in persons with and without shoulder impingement syndrome. *BMC Musculoskelet Disord* 2014;**15**:1.
3. Weir JP. Quantifying test-retest reliability using the intraclass correlation coefficient and the SEM. *J Strength Cond Res* 2005;**19**(1):231–40.
4. Kottner J, Gajewski BJ, Streiner DL. Guidelines for reporting reliability and agreement studies (GRRAS). *Int J Nurs Stud* 2011;**48**(6):659–60.
5. Sim J, Wright CC. The kappa statistic in reliability studies: use, interpretation, and sample size requirements. *Phys Ther* 2005;**85**(3):257–68.

Débora Juliana Souza do Rosário, PT
Postgraduate Program in Health Sciences, Federal University of Amapá, Macapá, AP, Brazil

Laís Ferreira Tapajós, PT
Department of Biological Sciences and Health, Federal University of Amapá, Macapá, AP, Brazil

Denise Gabrielle Feitosa Ribeiro, PT, Areolino Pena Matos, PT, PhD
Postgraduate Program in Health Sciences, Federal University of Amapá, Macapá, AP, Brazil

Almir Vieira Dibai Filho, PT, PhD
Postgraduate Program in Adult Health, Federal University of Maranhão, São Luís, MA, Brazil

Vânia Tie Koga Ferreira, PT, PhD*
Postgraduate Program in Health Sciences, Federal University of Amapá, Macapá, AP, Brazil

*Federal University of Amapá, Postgraduate Program in Health Sciences, km 2, Jardim Marco Zero, Macapá/AP, CEP 68911-419, Brazil.
E-mail address: vaniatie@gmail.com (V.T.K. Ferreira)

https://doi.org/10.1016/j.bjps.2021.05.036

Universal ICG stage

A comparison of structural strength of free and attached earlobes using Young's modulus: A novel method

Dear Sir,

The ear lobules play an important role in facial aesthetics. Decorating with jewellery has its own complications like enlarged ear hole and split ear lobule with a prevalence of 2.4%[1]. The pathophysiology of split ear lobule or enlarged ear hole is mainly determined by the weight of the ear stud[2], allergic tendency of the patient's skin (intrinsic factor) to the metal used in jewellery (contact dermatitis) and sometimes even posttraumatic (injury due to stretching by a child held by the mother).

Morphologically these lobules are classified as free and attached variety determined by racial, ethnic and genetic factors. Clinically we observe ear lobule deformities more often in free than attached variety. Hence, we hypothesised that the attached variety owing to stronger support because of the increased area of attachment with the side of the face, would be more resistant to splitting or enlargement of the lobule.

Since, histologically the lobule consists of epidermis, dermis and hypodermis enveloping a fibrofatty tissue, it can be considered as skin in general. Previous studies to measure skin elasticity were not found to be useful for a small anatomical part such as an ear lobule. So a novel method of measurement using an ingenious instrument (Figure 1), (devised by the main author) was used to test our hypothesis. We aimed to estimate the Young's modulus of both lobule types, compare them statistically and hence interpret their results. According to laws of physics, the elasticity of a material is a measure to resist deformation and hence increases with increase in Young's modulus. Hence the Yield Max or maximum load the material can withstand also increases with increasing Young's modulus. Our method can be considered as part of indentation /tensile technique of assessment of skin elasticity.

After seeking an Institute ethical clearance, 70 female volunteers aged 17–49 years (35 each if free and attached variety) consented for this pilot study. All volunteers had a pre-existing ear hole. Anyone with size of earhole >3 mm was excluded from the study.

A weight of 25 g was mounted on the tail end of the tool and the displacement of the pointer which is a part of the tool, was measured with callipers after extrapolating it to the side of the neck . Anthropometric measurements were recorded from the right ear of every individual (Figure 2) and Young's Modulus was calculated using Hooke's law as

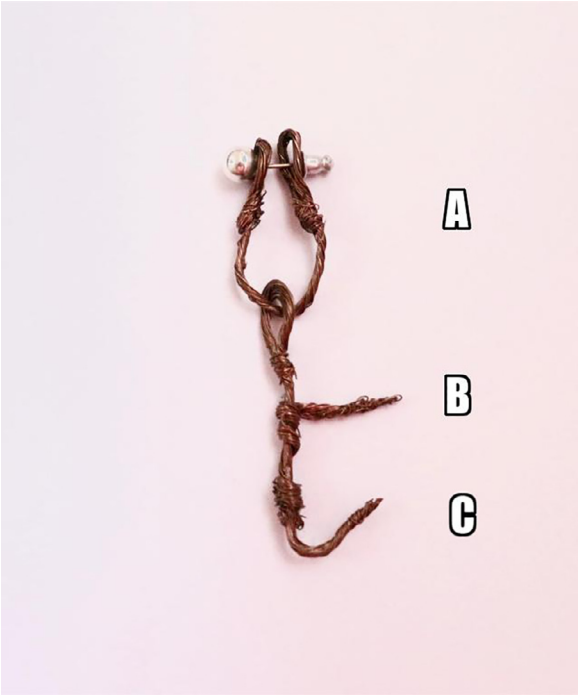


Figure 1 Design of the instrument used to find displacement. A: Mounting part: U shaped and ends in loupes to thread an ear stud. B: Pointer, wound around the central part of vertical limb of loading part and ends in a free part mildly blunted by folding on itself. C: Loading part, with a loupe in the upper part threaded to the mounting part and ends in a hook used for loading.

depicted in the figure and the results were analysed. Here the weight of the load is acting at the hole.

Attached lobe showed significantly decreased displacement ($p = 0.001$) and increased Young's Modulus ($p = 0.0007$) suggesting more stiffness as compared to free lobes [Supplementary Table 1, Supplementary Fig. 1, supplementary Fig. 2]. There was significant positive correlation of displacement with distance of hole from subaurale ($p = 0.0019$) and length of free lobe ($p = 0.0112$). Young's modulus had significant negative correlation with distance of hole from subaurale (0.018), length of free lobe ($p = 0.017$), horizontal length of lobe ($p = 0.003$), thickness of lobe ($p = 0.005$) and displacement ($p = 0.00$) [Supplementary Table 2, Supplementary Fig. 5]. The length of free earlobe indicates that part of earlobe that is freely suspended and does not have enough support, contributing to lower values.

The attached variety when compared to the free variety had Maximum yield of {(26.07 Kilopascals (KPa)} as against {(11.3 Kpa)} with statistically significant p value of 0.0007.

The measurements of Young's modulus in this study are quite comparable to the reported values of 4.5–8 KPa of Young's modulus of skin as found by other studies measured by indentation methods [3]. Interestingly, the distance of hole from the inferior border of earlobe also correlated negatively with Young's modulus. This can be explained by an increase in stress as the distance of the hole increases from the inferior border of the lobule and the horizontal diameter of the lobule at that point increases till a certain height leading to an increase in cross sectional area.

As average value of strain in our study sample was 0.24% which is less than 0.3% at which the skin behaves isotropically[4], the assumption of linear stress strain relation in our calculation proved to be correct. We calculated the maximum weight an ear lobule can withstand based on the assumption of 0.7% strain as Yield Max[5], to be 62.5 g (free earlobule) and 87.5 g (attached earlobe). The average strain of free lobule was 0.28% and 0.2% for attached.

This study helps to understand the key difference in terms of structural support between the two spectrum of ear lobules, proving our hypothesis that attached variety is structurally more resistant to deformation than the free variety and might help in refining our surgical methods to correct enlarged ear holes and split ear lobules. The result can also be translated in commercial context by the jewellers to design and sell jewellery mindfully as per the characteristics of individual ear.

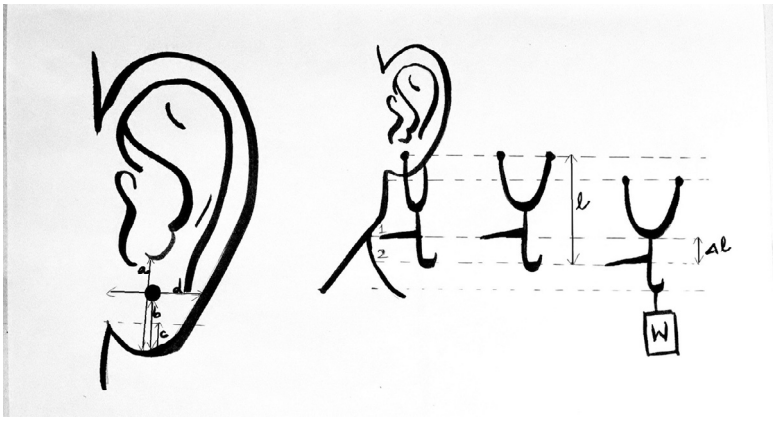


Figure 2 Anthropometric measurements to calculate Young's Modulus. a = Vertical diameter from the lower most limit of antitragus to subaurale. b = Vertical dimension from the earhole to the subaurale. c = The vertical distance showing level of attachment/earlobe that is freely hanging (c). d = Horizontal dimension across the lobule at the level of ear hole (d). 1. Initial position of pointer. 2. Final position of pointer after weight has been suspended. Δl = Displacement. l = length of the instrument.

Declaration of Competing Interest

Patent for the instrument devised for the measurements in this study has been filed in our country with application number- Legal-(341)/2019-2020/01 on 10/08/2019. No other declaration of interests applicable.

Data sharing

DOI: 10.17632/4jtc76xd2r.1.

Funding source

None.

Ethical Approval

Ethical approval sought from IEC (Institutional ethical committee).

Acknowledgements

We thank all the participants of the study and we also thank Miss Vaishali Verma, Application engineer for her inputs.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2021.05.001.

Reference

1. Khilnane AK, Thadanee R. Clinical and demographic profile of cases requiring ear lobe repair in North Gujarat. *Natl J Med Res* 2013;**3**(2):140-2.
2. Vathulya M, Jain V, Jain P. Simple tips for ear lobule reconstruction-"lobuloplasty revisited.". *Indian J Otolaryngol Head & Neck Surg* 2017. doi:10.1007/s12070-017-1186-2.
3. McKee CT, Last JA, Russell P, Murphy CJ. Indentation versus tensile measurements of Young's modulus for soft biological tissues. *Tissue Eng Part B* 2011;**17**(3):155-64. doi:10.1089/ten.teb.2010.0520.
4. Holzapfel GA. *Biomechanics of soft tissue*. France: Handbook of material behaviour nonlinear models and properties; 2000.
5. Pawlaczyk M, Lelonkiewicz M, Wieczorowski M. Age-dependent biomechanical properties of the skin. *Adv Dermatol Allergol* 2013;**5**:302-6. doi:10.5114/pdia.2013.38359.

Madhubari Vathulya, MS, MCh (Plastic Surgery)*
Associate Professor
Department of Burns and Plastic Surgery, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, 249203 India

Megha Agrawal, MD(Physiology)
Senior Resident
Senior Resident, Department of physiology, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, 249203 India

Latika Mohan, MD (Physiology)
Professor and Head of Department
Department of Physiology, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, 249203 India

Pankaj Kandwal, MS (Orthopaedics)
Additional Professor and Head of Department
Department of Orthopaedics, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, 249203 India

Vickram Vathulya, MS, Phd (Silicon carbide Power devices)
Vice President
Vice President, MAXIM Integrated, SanJose, California, USA

*All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India
E-mail addresses: madhubari@yahoo.co.in (M. Vathulya), dragrawalmegha@gmail.com (M. Agrawal), latikamohan@gmail.com (L. Mohan), pankajkandwal27@yahoo.com (P. Kandwal), vathulya@yahoo.com (V. Vathulya)

https://doi.org/10.1016/j.bjps.2021.05.001

Universal ICG stage

An improved cosmetic suture method without stitch removal for facial skin

Dear Sir,

After surgery or trauma involving the face occurs, especially after acute trauma, a good visual outcome after repair is usually the factor most important to the patient. The ideal skin suture method should be able to achieve moderate valgus, a close fit, sufficient tension reduction, and good hemostasis; not involve foreign bodies; be easy to care for; and not yield any suture marks.[1-2] Currently, there are a large number of suture methods, such as intradermal submerged sutures, intermittent submerged vertical mattress sutures, and wedge resection combined with improved submerged vertical mattress sutures, that can partially achieve the above effects.[3,4] However, there are still many problems with these methods. In this study, an improved suture method was used to suture facial incisions and was compared with the traditional method to determine the effectiveness of the improved method in improving the postoperative incision condition and the overall satisfaction of patients after facial cosmetic surgery.

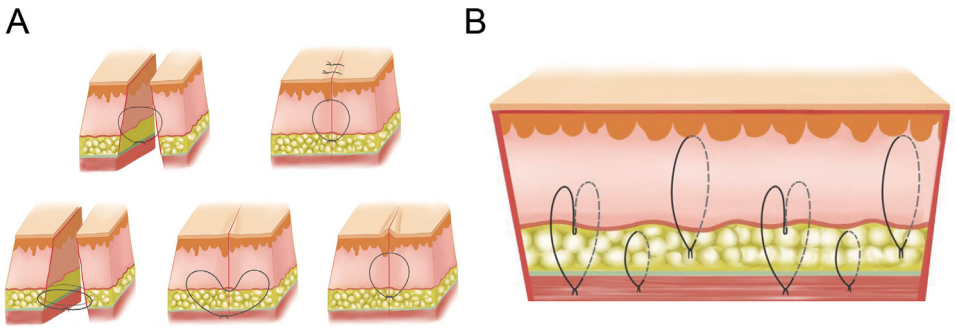


Figure 1 Steps of the two stitching techniques. A, Details of each step of the traditional suture technique (top) and the new suture technique (bottom). B, Overview of the new method.

For the improved suture technique, both sides of the wound were trimmed to create trapezoidal (T shape) incisions. In the first step, absorbable surgical sutures (PGAs) were used in the bottom fascia layer to draw the knots with an intermittent vertical mattress inversion suture. The knot was buried deep in the fat layer to shrink the shallow and deep fascial tissues, which reduces the wound area and reduces tension. The second step was to perform the modified dermis suture method. The first needle was used to pass an absorbable surgical suture (PGA) into the subcutaneous superficial fascia layer on the side of the incision. It passed through the dermis for approximately 3–5 mm, and the needle was pulled into the basal layer of the incision. Then, the needle was inserted from the basal layer of the contralateral incision, passed through the dermis for approximately 3–5 mm, and exited from the superficial subcutaneous fascia layer. The suture was drawn and knotted, and the knot was buried in the superficial fascia layer under the skin. The second needle was inserted into the superficial fascia layer of the skin at a distance of 2 mm from the first needle. The needle was inserted into the lower layer of the dermal papilla, and the needle was inserted into the lower layer of the opposite dermal papilla. The subcutaneous superficial fascia layer was pulled upward and knotted with sutures, and the knots were buried in the subcutaneous superficial fascia layer; the stitch length was approximately 2–3 mm, and the two stitches formed a staggered tension-reducing suture. The tension in the skin was released completely in the subcutaneous fascia layer and the dermis layer, and the interlaced spatial layers reduced the tension in each layer. After the interlaced suture was completed, the wound was slightly raised due to the "T" shape, and the epidermis appeared more natural. No stitching was required. The traditional method and the improved method are showed in Figure 1 **and Supplementary Video 1 and 2**.

In this study, there were 62 patients in the conventional suture group and 68 patients in the improved method group. There was no significant difference in age or incision length between the two groups. The postoperative valgus height of the improved method group was significantly higher than that of the conventional suture group. It also has significant advantages in terms of color, blood vessel distribution and the final scar thickness. The satisfaction score of the improved suture method group was statistically significantly than that of the traditional suture method group (**see the supplementary material for detailed data information**). These findings showed that the improved method had obvious advantages and could significantly reduce the severity of the scar-related problems that can occur in the later stages of incision healing.

Compared with the traditional subcutaneous suture method, this improved method has the following differences: first, trimming the cutting edge to form a trapezoid induces full valgus after the incision is closed; second, trapezoidal resection increases the contact area of the dermis on both sides of the wound margin and increases the number of local reconnected or recanalized microvessels, thereby promoting blood supply reconstruction; third, the "heart-shaped suture" can not only ensure that there are no suture foreign bodies in the dermis at the wound edge but also accurately align the incision and avoid pricking the dermis at the wound edge; fourth, the stitches can sneak as far as possible in the dermis layer to grasp tougher dermal tissues and achieve full reduction of the wound margins, thereby inhibiting scar formation. Our clinical practice has proved that this improved method has high application potential.

Declaration of Competing Interest

The authors declare that they have no conflict of interest.

Funding

This work was supported by the Joint Medical Research Project of Chongqing Science and Technology Bureau and Health Commission, Chongqing Science and Technology Commission (CN) (No. 2019QNXM040).

Ethics Approval

The trial protocol was approved by Chongqing Hospital of Traditional Chinese Medicine.

The study was performed in accordance with the Helsinki Declaration and Good Clinical

Practice guidelines.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2021.03.132.

References

1. Yang J, Kim KH, Song YJ, et al. Cosmetic outcomes of cesarean section scar; subcuticular suture versus intradermal buried suture. *Obstet Gynecol Sci* 2018;**61**(1):79–87.
2. Luck R, Tredway T, Gerard J, Eyal D, Krug L, Flood R. Comparison of cosmetic outcomes of absorbable versus nonabsorbable sutures in pediatric facial lacerations. *Pediatr Emerg Care* 2013;**29**(6):691–5.
3. Sadick NS, D'Amelio DL, Weinstein C. The modified buried vertical mattress suture. A new technique of buried absorbable wound closure associated with excellent cosmesis for wounds under tension. *J Dermatol Surg Oncol* 1994;**20**(11):735–9.
4. Zhang X, Diao JS, Guo SZ, et al. Wedge-shaped excision and modified vertical mattress suture fully buried in a multilayered and tensioned wound closure. *Aesthetic Plast Surg* 2009;**33**(3):457–60.

Xing Chen
Associate Professor
Bo Lv
Senior Resident
Ya Liu
Professor and Head of Department
Mengya Huang
Additional Professor and Head of Department
Jingling Guan
Vice President
Xun Zhou
Department of Cosmetology and Dermatology, Chongqing Hospital of Traditional Chinese Medicine, Chongqing 400021, China
E-mail address: zhouxun123@sina.com (X. Zhou)

https://doi.org/10.1016/j.bjps.2021.03.132

Universal ICG stage

The state of plastic surgical training: Results of the PLASTA 2020 national training survey

Dear Sir,

Training in plastic surgery is constantly evolving with the specialty. The introduction of a competency based-curriculum from August 2021, coupled with a drive towards post-Certification of Completion of Training (CCT) sub-specialist training, aligns with aims of the Shape of Training review[1] to produce a workforce competent in the generality of the specialty and able to deliver emergency care at the point of CCT. Optimising training is therefore vital to ensure tomorrow's consultants are able to meet the subspecialist needs of patients. We report the results of the 2020 PLASTA (Plastic Surgery Trainee Association) National Training Survey, compare these to the 2018 results[2], and highlight key results pertinent to current training considerations.

All UK and Republic of Ireland trainees with a National Training Number (NTN) were invited to complete a web-based questionnaire using REDCap (Research Electronic Data Capture). The survey was accessible over a three-week period in May 2020. Trainees were asked to report their experience prior to COVID-19. All completed surveys were included in the analysis.

One hundred forty-nine complete responses were received (47% of UK NTN trainees, male: female ratio 1:1). All training regions and grades were represented. Most respondents (94%) would recommend their region to prospective applicants. Sub-specialty career aspirations were largely in keeping with those declared by current plastic surgery consultants in the UK (Figure 1), except lower limb surgery (declared by 17% of consultants[3] *vs.* 52% of trainees), commensurate with the subspecialty's ongoing expansion.

Despite being a Joint Committee on Surgical Training (JCST) Quality Indicator[4], only 40% of respondents received at least two hours of formal, facilitated teaching per week. This was lower than in 2018 (60%)[2].

Trainees reported poor access to aesthetic training, also a JCST Quality Indicator. Only 17% were able to attend one aesthetic list or clinic per month, and 71% reported attending these outside contracted hours. Most respondents (94%) would like to undertake a formal aesthetic rotation (this was available in four regions), and 42% planned to undertake an aesthetic fellowship post-CCT. Building nationally standardised, formal rotations in aesthetic surgery into training programmes would facilitate adequate training in line with syllabus requirements, as would more post-CCT fellowships and opportunities for mentorship. This will ensure trainees can meet the standards required by the Cosmetic Surgery Certification Scheme at CCT, maintain the footprint of the specialty, and ensure safe practice for patients.

Indicative numbers were difficult to achieve in Dupuytren's surgery and lymphadenectomy (Figure 2). A quarter of respondents reported that NHS cases were contracted out to non-NHS sites where trainees were not able to attend, most commonly for Dupuytren's surgery. Lymphadenectomy numbers in melanoma will continue to decrease as a result of the recommendations of the MSLT-2 trial[5]. PLASTA is working with the SAC to make changes to the indicative numbers to ensure that they are reflective of current clinical practice.

A number of other surgical training programmes now offer run-through training. Only 34% of respondents thought this would be a good idea for plastic surgery. Respondents cited improved personal life and better clinical experience as advantages, but difficulty selecting high quality candidates at a junior level and concern for loss of broad-based training as disadvantages.

Work presented in part at BAPRAS Winter Scientific Meeting, December 2020 (virtual).

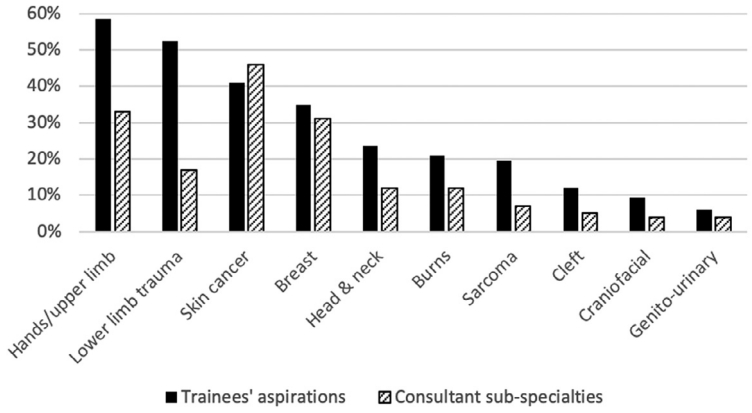


Figure 1 Sub-specialty career aspirations of trainees compared to consultant sub-specialty interests as per the 2019 BAPRAS member workforce survey[3] (in both surveys, respondents were asked to indicate their top three choices).

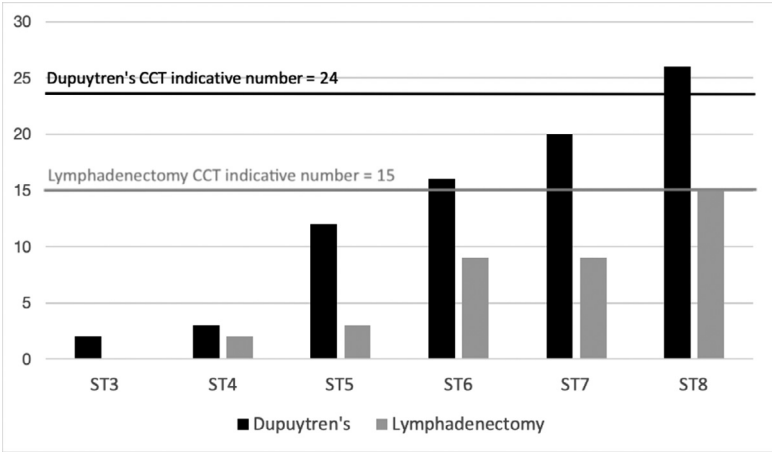


Figure 2 Median Dupuytren's surgery and lymphadenectomy logbook numbers of respondents, shown for each year of training.

Eighty-five percent of respondents planned to pursue a pre-CCT fellowship. Of these, 71% planned to pursue a Training Interface Group (TIG) fellowship, highlighting the importance of TIGs to our specialty. Training organisations should consider that moving TIGs post-CCT will put them in direct competition with consultant posts and fellowships abroad. Allowing trainees to CCT early on the competency-based curriculum may mitigate this by enabling them to undertake this period of subspecialist training without prolonging the overall training pathway.

Seven percent of respondents ($n = 10$) were training less than full time (LTFT) at the time of survey, but 46% would consider doing so in future. Nearly half (42%) felt 'trainers' perceptions' would be a barrier. Increased uptake of LTFT training has already happened in other specialties[6]. It is thought to have had a positive impact on work-life balance, recruitment, and retention. The JCST should monitor the uptake of LTFT training, and BAPRAS should account for it in workforce planning as consultant and trainee numbers may require further expansion as a result.

Twenty respondents had been pregnant during training; 80% felt inadequately informed about activities to avoid with nearly two-thirds expected to provide this information themselves. Thirty-three had undertaken a period of extended parental leave, of whom only 28% were supported in their return to clinical practice by a dedicated team. Adequate safety advice should be provided by employers, and comprehensive support on return to training should be the norm.

Overall, UK plastic surgery trainees report a very positive training experience. Annual surveys are vital to ensure the Plastic Surgery training programme remains world-class in meeting the needs of trainees, the specialty, and our patients.

Funding

None.

Ethical approval

N/A

Declaration of Competing Interest

None .

Acknowledgements

The authors are grateful for the contributions of the 2020 PLASTA Executive Committee to the design and implementation of the National Training Survey, including the named authors and Vikram Sharma, Joseph Ward, Dimitris Reissis, Bernard Robertson, Vimal Gokani, Justin Wormald, Ian King and Rob Staruch.

References

1. Greenaway D. Shape of Training Review: securing the future of excellent patient care. Final report of the independent review led by Professor DavidGreenaway. 2013. https://www.gmc-uk.org/-/media/documents/shape-of-training-final-report_pdf-53977887.pdf. [Accessibility confirmed January 1, 2021].
2. Fell M, Staruch R, Baker BG, Nicholas R, Howes R, Amin K, et al. Plastic surgery training in the UK: results from a national survey of trainee experiences. *JPRAS Open* 2020;**25**:72–82.
3. British Association of Plastic Reconstructive and Aesthetic Surgeons. 2019 Plastic Surgery Workforce UK and Republic of Ireland Profile and Analysis. http://www.bapras.org.uk/docs/default-source/workforce-planning/2019-survey-results-final.pdf?sfvrsn=2. [Accessibility confirmed January 1, 2021].
4. Joint Committee on Surgical Training. Plastic Surgery Quality Indicators 2019. https://www.jcst.org/-/media/files/jcst/quality-assurance/quality-indicators/plastic-surgery-qis-final-v10.pdf. [Accessibility confirmed January 1, 2021].
5. Faries MB, Thompson JF, Cochran AJ, Andtbacka RH, Mozzillo N, Zager JS, et al. Completion dissection or observation for sentinel-node metastasis in melanoma. *N Engl J Med* 2017;**376**(23):2211–22.
6. Harries RL, Gokani VJ, Smitham P, Fitzgerald JEF. Less than full-time training in surgery: a cross-sectional study evaluating the accessibility and experiences of flexible training in the surgical trainee workforce. *BMJ Open* 2016;**6**(4):e010136.

Susan A. Hendrickson*
Associate Professor
Plastic Surgery Trainees' Association (PLASTA), United Kingdom
Royal Devon and Exeter Hospital, Exeter, United Kingdom

Ewan Campbell
Senior Resident
Plastic Surgery Trainees' Association (PLASTA), United Kingdom
Royal London Hospital, London, United Kingdom

Serena V. Martin
Professor and Head of Department
Plastic Surgery Trainees' Association (PLASTA), United Kingdom
Ulster Hospital, Dundonald, Northern Ireland, United Kingdom

Katie Young
Additional Professor and Head of Department
Plastic Surgery Trainees' Association (PLASTA), United Kingdom
AO Research Institute, Davos, Switzerland

Poonam Valand
Vice President
Plastic Surgery Trainees' Association (PLASTA), United Kingdom
Salisbury District Hospital, Salisbury, United Kingdom

Matthew Fell
Plastic Surgery Trainees' Association (PLASTA), United Kingdom
North Bristol NHS Trust, Bristol, United Kingdom

Benjamin G. Baker
Plastic Surgery Trainees' Association (PLASTA), United Kingdom
Manchester University Hospitals NHS Foundation Trust, Wythenshawe Hospital, Manchester, United Kingdom

*Corresponding author at: Plastic Surgery Department, Southmead Hospital, Southmead Road, Bristol BS10 5NB
E-mail address: susan.hendrickson@nhs.net (S.A. Hendrickson)

https://doi.org/10.1016/j.bjps.2021.03.127

Universal ICG stage

Augmented reality-assisted deep inferior epigastric artery perforator flap harvesting

Dear Sir,

Breast reconstructive surgery with deep inferior epigastric artery perforator (DIEP) flaps is a microsurgical technique that requires the dissection of small perforating vessels through the rectus abdominis muscle and fascia[1]. The anatomical pathways of these vessels complicate the procedure[2] and can increase the operative time. Complementary preoperative examinations[3] are used to map the perforators and optimize the dissection time.

For this, we perform a preoperative abdominopelvic computed tomography (CT) scan for each patient with a three-dimensional (3D) model to select and position the perforating vessels. This examination is completed by a Doppler ultrasound to validate the positions and the permeability of the perforators. Overall, this marking process is sometimes complex, and requires experience to properly identify the position of the perforating vessels during surgical planning. This process could be facilitated by a guidance system using a 3D model viewed in augmented reality (AR) which enables

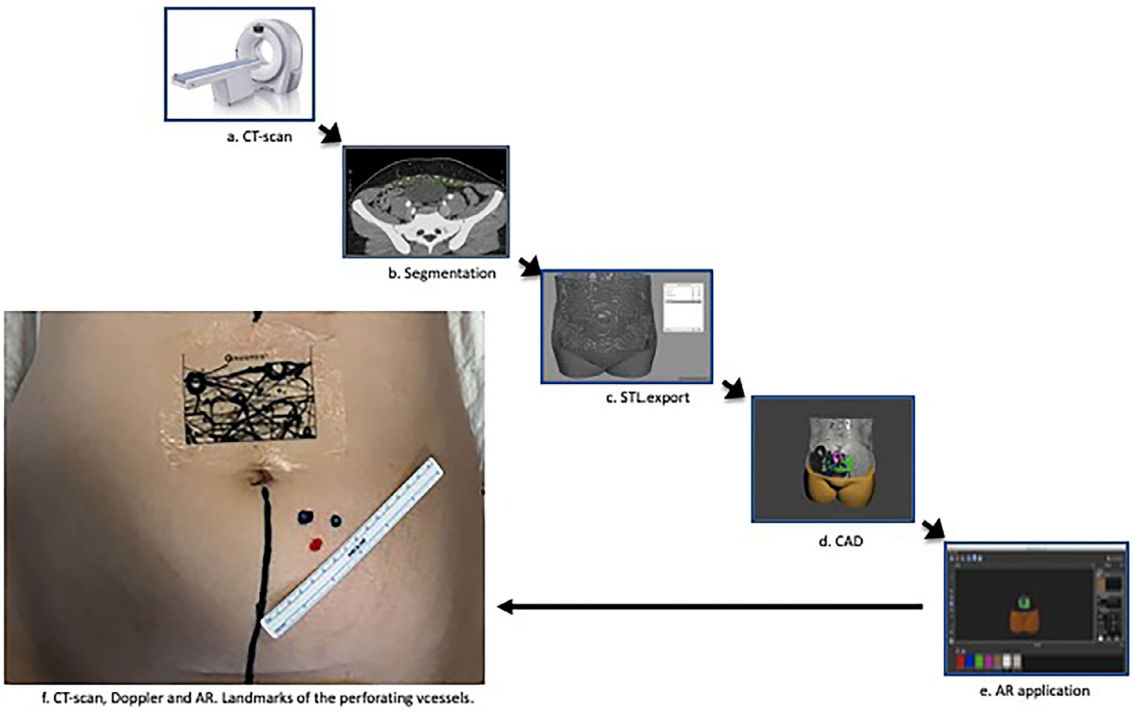


Figure 1 Workflow: From the preoperative CT-scan to the preoperative visualization in augmented reality (AR) of the perforating vessels on the patient's body. a. Preoperative abdominopelvic CT-scan. b. semiautomatic segmentation. c. 3D model of the reconstruction in Standard Tesselation Language (STL) format file. d. Conception Assisted Design (CAD) of the 3D model. e. transfer of the 3D model file in the AR-software. f. CT-scan, Doppler and AR landmarks of the perforating vessels. Tracker printed on a transparent sterile dressing.

the positioning of vascular elements without the need of a remote screen or printout.

We conducted a feasibility study (proof of concept) on a perforation-tracking AR visualization technique that allows the clinician to check the transposition of the virtual 3D model reconstructed from CT angiography onto the patient in real time with motion tracking.

Based on the preoperative abdominopelvic CT-scan (Figure 1a,b), a 3D model was created (Figure 1c,d) into an AR software (Figure 1e) and was synchronized with the patient's movements using a tracker printed on a transparent sterile dressing (Figure 1f).

The perforating vessels emerging through the muscle were represented with a red sphere and three location landmarks were placed on patient's skin for each perforator: one from the AR model visualized on a digital tablet (AR-landmark), one from CT (CT-landmark), and one from pencil Doppler (D-landmark) (Figure 1f). The D-landmarks were our reference.

The distances between landmarks on the skin were measured (video 1). Our endpoint was the accuracy defined as the distance between the landmark of emergence of the perforator through the muscle on the AR- and D-landmarks. A distance of up to 10 mm was considered as accurate.

From the 12 patients included in the study, 26 perforating vessels were studied, with a median of two arteries per patient. The median distance was 2 mm between the D- and AR-landmarks and the median distance between the D-landmark and the CT-landmark was 2.5 mm. Nearly all the AR-landmarks (92%) were at a distance $\leq$ 10 mm from the D-landmark (Video1).

During this study there was no flap loss or partial necrosis.

This study confirms that AR-assisted identification of perforators with a digital tablet for the planning and execution of DIEP flap reconstructive surgery is accurate.

In our study, the median distance between the D-landmark and the CT-landmark was 2.5 mm, which can be explained by the oblique path of certain perforators founding when we incline the pencil over the skin. Anyway, both of the landmarks had proven their effectiveness.

In a similar study published in 2010[4], the investigators identified the perforators using a software that generated 3D volume rendered images. They reported an average difference of 2.3 mm for the umbilicus-perforator distance between 3D images and intraoperative measurements.

Other investigators used a video projector with the software to locate perforator flaps and identified 29 locations among 34 transplanted perforators. They located the perforators faster than with the Doppler and the preoperative planning time was reduced[5].

This constitutes a new way of visualizing on demand radiological information in real time during the surgery.

Nevertheless, the creation of 3D AR model by the radiologist is very time-consuming due to the lack of automatized software for the workflow integration.

However, this time was decreased by the experience of the radiologist.

There are several limitations to this preliminary study. First, there were only two radiologists involved. But the reproducibility of this method would require it to be validated by blind analysis, with one team performing perforator mapping and another evaluating. Second, surgeons of different levels should perform the surgery and assess the level of satisfaction.

Another limit was the lack of experience from the surgeon using the morphological Doppler.

We could also have used smart glasses to visualize the perforators intra-operatively but the models currently available are not powerful enough for the full procedure. Moreover our guidance system needs the placement of a tracker near the operative field, within the visual field of the camera.

As a result, we suggest that AR-assisted 3D modeling is a non-invasive procedure for preoperative mapping in DIEP flap surgery. Further works are required to develop and evaluate the new generations of AR devices in particular smart glasses that would be more accurate, ergonomic and, therefore, usable during the surgery.

Video 1. Visualization of the AR reconstruction with the glasses: how do we see the mapping with the movements of the patient

Funding

None.

Declaration of Competing Interest

None declared.

Ethical approval

An ethical approval was obtained for this study: No. 2017-A00810-53.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2021.03.122.

References

1. Koshima I, Soeda S. Inferior epigastric artery skin flaps without rectus abdominis muscle. *Br J Plast Surg* 1989;**42**:645:8.
2. Ireton JE, Lakhiani C, Saint-Cyr M. Vascular anatomy of the deep inferior epigastric artery perforator flap: a systematic review. *Plast Reconstr Surg* 2014;**134**:810e:21e.
3. Smit JM, Klein S, Werker PMN. An overview of methods for vascular mapping in the planning of free flaps. *J Plast Reconstr Aesthet Surg* 2010;**63**:e674:82.
4. Gacto-Sánchez P, Sicilia-Castro D, Gómez-Cía T, et al. Use of a three-dimensional virtual reality model for preoperative imaging in DIEP flap breast reconstruction. *J Surg Res* 2010;**162**:140:7.
5. Hummelink S, Hoogeveen Y, Kool LS, Ulrich DJ. A new and innovative method of preoperatively planning and projecting vascular anatomy in DIEP flap breast reconstruction: a randomized controlled trial. *Plast Reconstr Surg* 2019;**143**:1151e–1158e.

Alexandre Fitoussi, Vania Tacher, Frederic Pigneur
Professor and Head of Department
Medical Imaging department, Henri Mondor Hospital, 51, Avenue du Marechal Lattre de Tassigny, 94000 Creteil, France

Julie Heranney, Dana Sawan
Vice President
Plastic, Reconstructive, Aesthetic and Maxillofacial Surgery Department, Henri Mondor Hospital, 51 Avenue du Marechal de Lattre de Tassigny, 94000 Creteil, France

Thu Ha Dao
Medical Imaging department, Henri Mondor Hospital, 51, Avenue du Marechal Lattre de Tassigny, 94000 Creteil, France
Henri Mondor Breast Center, Henri Mondor Hospital, 51 Avenue du Marechal de Lattre de Tassigny, 94000 Creteil, France

Barbara Hersant
Plastic, Reconstructive, Aesthetic and Maxillofacial Surgery Department, Henri Mondor Hospital, 51 Avenue du Marechal de Lattre de Tassigny, 94000 Creteil, France
Henri Mondor Breast Center, Henri Mondor Hospital, 51 Avenue du Marechal de Lattre de Tassigny, 94000 Creteil, France

Jean-Paul Meningaud
Plastic, Reconstructive, Aesthetic and Maxillofacial Surgery Department, Henri Mondor Hospital, 51 Avenue du Marechal de Lattre de Tassigny, 94000 Creteil, France

Romain Bosc
Plastic, Reconstructive, Aesthetic and Maxillofacial Surgery Department, Henri Mondor Hospital, 51 Avenue du Marechal de Lattre de Tassigny, 94000 Creteil, France
Henri Mondor Breast Center, Henri Mondor Hospital, 51 Avenue du Marechal de Lattre de Tassigny, 94000 Creteil, France
INSERM Team U955-E10, Biology of the NeuroMuscular System, Paris East University, 94000 Créteil, France
E-mail address: romainbosc@gmail.com (A. Fitoussi)

https://doi.org/10.1016/j.bjps.2021.03.122

Universal ICG stage

Lockdown lessons: The virtual cleft multidisciplinary clinic

Dear Sir,

Correspondence

The COVID-19 pandemic has been a potent catalyst for innovation. Plastic surgery has been at the forefront of this movement during the pandemic.[1] With a broad range of elective practices, involving multiple specialties, teams have been required to reconfigure services. The objective of these changes has been to limit face-to-face contact, slow the spread of disease and save lives.[2]

Telemedicine has been shown to benefit patients and is cost-effective.[3] Heeding the information governance advice from NHSX,[4] the Spires Cleft Lip and Palate (Cleft) Service rapidly increased the use of telemedicine.

The Multidisciplinary Team (MDT) was required to speedily pivot to meet patient needs, be candid about what can be achieved remotely, and adapt the service through quality improvement. Initially patients were triaged to ascertain whether a face-to-face appointment was essential.

To date, 243 virtual appointments have been conducted by the Cleft MDT (ranging from neonates to adults, including antenatal counselling). To evaluate this change in practice, the first 40 patients received satisfaction questionnaires, to inform the service improvement process. CLAPA also performed a national patient feedback survey and received 268 responses (a total of 19 from our region). Of our first 20 appointments only one was aborted and converted to telephone consultation

Text 1 - hyperlink

Cleft MDT members underwent a 30-minute interview performed by the Cleft Registrar with the aim of gathering perspectives on remote consultation. Open-ended questions were employed e.g. what can and cannot be effectively achieved virtually.

Prior to patient consultations, cases were discussed within the MDT to ascertain what information was needed to facilitate a management plan. With multiple professionals simultaneously on a call, it was important to set ground rules. In terms of etiquette, a consultation lead was allocated to facilitate introductions (and establish who else is present on the call to ensure patient confidentiality) and rotate discussion.

Advance preparation by all parties was essential for success. Intra-oral examination proved a challenge via videocall so parents were invited to email photos to a secure account prior to the consultation. A time range was provided for appointment times (likened to a home delivery!) to accommodate varying clinic speeds. Families were asked to create a calm environment by removing distractions and keeping background noise to a minimum.

Antenatal counselling could be effectively achieved remotely. Initial feeding assessments of infant referrals were performed face-to-face in the maternity unit. Only limited feeding assessments could be achieved via telemedicine; infants with complex problems were deemed unsafe to assess remotely.

Speech and Language Therapy (SLT) was delivered to pre-school and school age children. Audio quality was sufficiently adequate for broad judgements regarding speech sounds (articulation), voice quality (resonance) and for therapeutic exercises but not for detailed or diagnostic assessment.

Clinical genetics identified that patients with dysmorphia required a face-to-face review to identify subtle findings (e.g. to evaluate hair, skin and limbs), however video consultation for isolated findings, reassurance and counselling was feasible.

Ear Nose and Throat (ENT) surgery required an initial face-to-face appointment to obtain a baseline hearing assessment and plan further management. Follow-ups were largely performed remotely. A follow-up audiogram was not routinely performed unless concerns were raised; limitations were acknowledged in the written correspondence issued following each appointment.

Video consultations were widely used in the dentistry department. For non-complex follow-up patients (e.g. those requiring a prosthesis review) a telephone call was satisfactory. Those patients who required further intervention were identified and managed within a single visit; this was vital for aerosol-generating procedures that required a *'fallow time'* to be incorporated within the clinic schedule.

Most of the orthodontic patient cohort had braces in situ and adjustments could not be achieved remotely. The British Orthodontic Society provided guidance and instructional videos for emergency care, enabling patients to self-help with brace problems (https://www.bos.org.uk/COVID19-BOS-Advice/Patients-Advice).

Psychological screening questionnaires were sent out via email in advance of appointments. A challenge of remote review was identifying the subtleties of body language and non-verbal cues.

Technology variables (e.g. WiFi speed, microphone and speaker quality) inevitably impacted upon the consultation. It is important to be aware that some software with embedded artificial intelligence (AI) has the ability to correct for loss of connectivity thus making the spoken voice sound more fluent.[5] Our department used the Attend Anywhere® platform (https://www.attendanywhere.com). There is also evolving AI that analyses speech and is used in the diagnosis of pathology and to prescribe exercises (https://news.microsoft.com/europe/features/how-ai-is-helping-children-overcome-their-speech-disabilities).

Questionnaire feedback and anecdotal testimony supported the observation that families felt more connected to the Cleft team and appreciated the additional support during lockdown. It was invaluable to ensure that communication channels remain open whilst treatment schedules

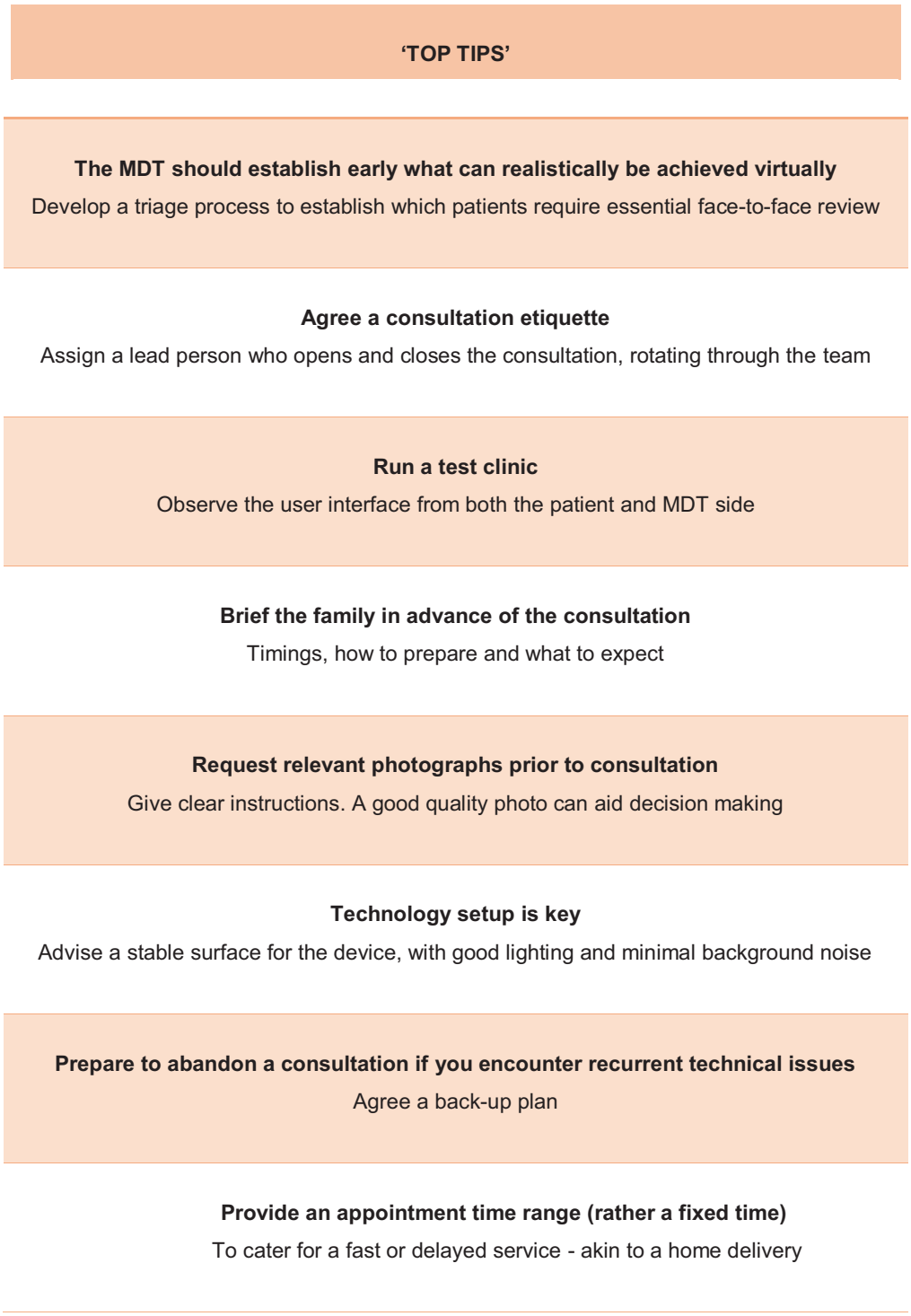


Figure 1 'Top Tips'.

remain uncertain. The Cleft team must remain sanguine, be patient with technology and recognise when a face-to-face consultation is required.

As the 'New Normal' is upon us, MDTs can strive for greater clinical efficiency and patient satisfaction when working with technology. We must measure performance, gather feedback and ensure that systems remain safe and effective (Fig. 1).

Text 1

Local feedback questionnaire – highlights

The first 20 virtual patient appointments were evaluated to inform ongoing practice. An open-ended questionnaire style was used.

- 95% of patients were '*extremely happy*' with the waiting times
- 85% described the overall experience as '*excellent*'
- 90% would be '*extremely happy*' to attend another virtual clinic
- 60% were found to be '*extremely happy*' with the overall sound quality; repetition was frequently necessary when the audio link was temporarily disrupted.

Patients and families were asked the following questions:

Q1: How useful did you find your Attend Anywhere appointment and clinic joining instructions?
Q2: How useful was your text reminder 24 h before your clinic?
Q3: How easy did you find it to join your clinic room in Attend Anywhere?
Q4: After joining your clinic room how happy were you with the time you waited to be seen?
Q5: How happy were you with the quality of the video during your consultation?
Q6: How happy were you with the quality of the sound during your consultation?
Q7: How was your overall Attend Anywhere clinic experience?
Q8: How happy would you be to attend a virtual cleft clinic again?
Q9: Any additional comments on your clinic experience today or possible future improvement ideas?

Cleft lip and palate association (CLAPA) summer survey 2020 - highlights

CLAPA performed a national patient feedback survey and received 268 responses (a total of 19 from our region).

- 75% of respondents found the appointments easier to arrange than face-to-face
- Overall the responses for the region were positive with participants '*agreeing*' or '*strongly agreeing*' that remote appointments had '*been comfortable and straightforward*'
- Feedback also highlighted how anxiety provoking this period has been, especially with those anticipating surgery with an unpredictable waiting time.

For extended national reporting and further details regarding the questions asked go to:
https://www.clapa.com/news-item/summer-survey-2020-the-results/

The cleft collective (CC) - highlights

CC also surveyed the impact of lockdown on healthcare, emotions and schooling of cleft patients (http://www.bristol.ac.uk/dental/cleft-collective/news/2020/cvd19infographic.html), echoing concerns identified by our team and CLAPA.

Declaration of Competing Interest

There are no conflicts of interest to declare.

Acknowledgements

N/A.

Funding

This research was not funded.

Ethical approval

N/A.

References

1. Armstrong A, Jeevaratnam J, Murphy G, et al. A plastic surgery service response to COVID-19 in one of the largest teaching hospitals in Europe. *J Plast Reconstr Aesthetic Surg* 2020. doi:10.1016/j.bjps.2020.03.027.
2. Shaw AV, Goodall R, Armstrong A, et al. Change in the face of the COVID-19 pandemic. *Plast Reconstr Surg* 2020. doi:10.1097/prs.0000000000007219.
3. Vyas KS, Rhodes Hambrick H, Shakir A, et al. A systematic review of the use of telemedicine in plastic and reconstructive surgery and dermatology. *Ann Plast Surg* 2017. doi:10.1097/SAP.0000000000001044.
4. NHSX Covid-19 information Governance Advice. https://www.nhsx.nhs.uk/key-information-and-tools/information-governance-guidance [Accessibility verified 1st January 2021].
5. Google's auto-complete for speech can cover up glitches in video calls https://www.technologyreview.com/2020/04/06/998410/google-artificial-intelligence-autocomplete-internet-voice-speech-glitches-video-call/ [*Accessibility verified 1st January* 2021].

A.C.G. Armstrong, J. Sibley, G. Phippen, S Popat, R. Pal, U. Kini, M. Hotton, G. Kidner, T.G. Thorburn, M.C. Swan
The Spires Cleft Centre, John Radcliffe Hospital, Headley Way, Headington, Oxford OX3 9DU, United Kingdom

E-mail address: alexander.armstrong@nhs.net (A.C.G. Armstrong)

https://doi.org/10.1016/j.bjps.2021.05.009

Universal ICG stage

Strategic planning of plastic surgery emergencies during the COVID-19 pandemic: Lessons learnt from a tertiary plastic surgery centre

Dear Sir,

In March 2020, the NHS began navigating the strategic planning minefield caused by the COVID-19 pandemic. A national lockdown to help control virus transmission, involving closure of non-essential businesses and schools and a requirement for social distancing was enacted on 26th March 2020. St. George's University Hospitals NHS Foundation Trust (St. George's) is a tertiary plastic surgery unit serving a population of 3.5 million people in South West London. Locally, a number of changes were required, including more senior receiving teams due to staff redeployment, reduced theatre services to onsite local anaesthesia/WALANT lists three days per week and twice weekly offsite GA capacity.

The aim of this study was to determine how the COVID-19 pandemic and lockdown affected the disease/injury profile and management of patients presenting to the plastic surgery emergency service at St. George's and identify how this may influence strategic planning in future surges.

We prospectively analysed the health records for patients presenting with plastic surgery emergencies from 1 March to 1 June 2020 and compared this to the same period in 2019. Data points included diagnosis, referral and treatment times, treatment delivered and follow up arrangements. Patients with multisystem or multispecialty conditions were excluded. Statistical significance for time intervals was calculated using a Mann-Whitney U test. Statistical significance for diagnosis, type of anaesthesia and type of follow-up were evaluated using a Chi-square test.

Emergency referrals to St. George's decreased from 1070 in 2019 to 692 in 2020. This significant decrease of 35.3% ($p<0.01$) corresponds to data in other studies.[1,2] There was a similar gender distribution in both years. The age distribution in the adult population was also similar in the two study periods (Figure 1). Patients under the age of 18 accounted for a large proportion in both years, with 493 patients (46.4%) in 2019 and 255 patients (36.8%) in 2020. We postulate that this relative reduction of 9.6% may be caused by decreased team-based activities as a result of school closure and the requirement of social distancing.

Although we anticipated a possible delay in presentation, the mean time was 1.6 days in 2020 compared to 1.0 days in 2019, suggesting that fear of attending the hospital was not an issue for patients. The time interval from assessment to treatment, either non-operative or operative, was similar, suggesting that the resources available were adequate to meet the reduced demand without significant delay.

With lockdown, we expected a change in injury patterns with a fall in work related injuries and an increase in 'do-it-yourself'/gardening activities. Our study supports this demonstrating a significant relative reduction in closed hand fractures (200 (18.7%) in 2019 vs 56 (8.1%) in 2020 ($p<0.01$)). There was a relative increase in open hand fractures (98 (9.2%) in 2019 vs 81 (11.7%) in 2020 ($p = 0.04$)) and tendon injuries (40 (3.7%) in 2019 vs 59 (8.5%) in 2020 ($p<0.01$)). Table 1 shows the overall distribution of injury patterns.

Crisis support services reported an increase in contacts during lockdown. However, this did not translate into increased patients presenting following domestic violence, (1.2% and 0.9% of emergencies in 2019 and 2020, respectively), or deliberate self-harm (1.3% and 1.4% of attendances in 2019 and 2020, respectively). Prolonged or repeated lockdown combined with ongoing economic and psychological burden may influence this in the future.

For patients that required surgery at St George's, general anaesthesia was the most common type of anaesthesia in 2019 (286 patients, 54.2%). During the COVID-19 pandemic, we tried to avoid general anaesthesia wherever possible to minimise the risk of exposure by aerosol generating procedures (including endotracheal intubation).[3] Whilst local anaesthesia/WALANT is most useful in patients with upper limb and hand injuries,[4] it could only be used in 197 (51.8%) of all of our patients undergoing surgery, as non-hand trauma and complex hand injuries commonly require regional or general anaesthesia. In future surges, anaesthetic support must therefore be maintained.

Face-to-face follow-up decreased from 75.8% in 2019 to 67.1% in 2020, as a result of virtual/telephone clinics that were introduced during the pandemic. The benefits of telemedicine are recognised, facilitating post-operative review of remotely located patients, thereby minimising inter-human contact and reducing the risk of transmission.[5] This was effective with a conversion of 50 (9.3%) emergency patients to virtual/telephone review ($p<0.01$). These facilities are now standard in our unit.

Overall, this analysis sets out lessons learnt in response to an evolving situation and how these may be used in future planning for similar scenarios. In acknowledging the unpredictability of the pandemic, we can ensure we remain flexible yet responsive to further pressures which may present different challenges. Forward planning for unknown incidents is a new reality to which we must adapt to ensure services remain safe and effective.

Figure 1 Age distribution of plastic surgery emergencies referred to St. George's University Hospital.
Children accounted for a large number of plastic surgery emergencies in both study periods. Age distribution was similar for all age groups, except for school aged children.

Table 1 Diagnoses of plastic surgery emergency referrals to St. George's University Hospital.
Table 1 shows the distribution of the referrals in the study periods in 2019 and 2020, which demonstrates a relative reduction in closed hand fractures and a relative increase in open hand injuries in 2020.

Diagnosis	2019		2020		p value
	N	%	N	%	
Hand					
Closed fracture	200	18.7%	56	8.1%	$p<0.01$
Open fracture	98	9.2%	81	11.7%	$p = 0.04$
Tendon injury	40	3.7%	59	8.5%	$p<0.01$
Other soft tissue trauma	418	39.1%	253	36.6%	$p = 0.52$
Infection	101	9.4%	74	10.7%	$p = 0.78$
Face					
Facial trauma	109	10.2%	76	11.0%	$p = 0.86$
Facial infection	4	0.4%	3	0.4%	$p = 1.00$
Lower limb †					
Soft tissue injury	51	4.8%	49	7.1%	$p = 0.08$
Other					
Burn	4	0.4%	4	0.6%	$p = 1.00$
Postoperative complication	18	1.7%	8	1.2%	$p = 0.93$
Other: trauma	17	1.6%	18	2.6%	$p = 0.84$
Other: infection	10	0.9%	11	1.6%	$p = 0.88$
Total					
Total	1070	100%	692	100%	

† Excludes major trauma.

Ethical approval

Not required.

Funding

None.

Declaration of Competing Interest

None.

References

1. Paiva M, Rao V, Spake CSL, et al. The impact of the COVID-19 pandemic on plastic surgery consultations in the emergency department. *Plast Reconstr Surg Glob Open* 2020;**8**:e3371.

2. Picardo NE, Walker H, Vanat Q, et al. Service reconfiguration in the department of hand surgery during the UK COVID-19 lockdown: Birmingham experience. *Postgrad Med J* 2021 Published online ahead of print, 2021 Jan 27.
3. Tseng JY, Lai HY. Protecting against COVID-19 aerosol infection during intubation. *J Chin Med Assoc* 2020;**83**:582.
4. Hobday D, Welman T, O'Neill N, Pahal GS. A protocol for wide awake local anaesthetic no tourniquet (WALANT) hand surgery in the context of the coronavirus disease 2019 (COVID-19) pandemic. *Surgeon* 2020;**18**:e67–71.
5. Funderburk CD, Batulis NS, Zelones JT, et al. Innovations in the plastic surgery care pathway: using telemedicine for clinical efficiency and patient satisfaction. *Plast Reconstr Surg* 2019;**144**:507–16.

G. Vissers
Associate Professor
M. Mantella
Senior Resident
A. Ra
Professor and Head of Department
A. Labib
Additional Professor and Head of Department
F. Ali
Vice President
Department of Plastic Surgery, St. George's University Hospitals NHS Foundation Trust, Blackshaw Road, London SW17 0QT, United Kingdom
E-mail address: ginovissers@doctor.com (G. Vissers)

https://doi.org/10.1016/j.bjps.2021.05.044

Universal ICG stage

Running a safe and effective Cleft Network Service in response to the COVID-19 pandemic

Dear Sir,

The COVID-19 pandemic has arguably been the biggest challenge to the National Health Service in its lifetime. This unprecedented strain and subsequent re-distribution of staff and resources has necessitated changes to all services, including network cleft teams.

Under pre-COVID circumstances, network cleft teams have looked after large geographical areas since the CSAG process of the late 1990s[1]. This regularly involved multidisciplinary face to face clinics at both hub and spoke hospitals, co-ordinating with operating at the central hub and a number of community based interventions ranging from speech therapy to dental services.

In the Yorkshire and Humber service, we have made changes to how we deliver our service to maximize safety of patients and staff while maintaining the high standard of care we provide.

Since the first wave of the pandemic we now discuss all patients due to attend clinic in a clinician only multidisciplinary team (surgeon, speech therapist, cleft nurse specialist, paediatric dentist, orthodontist) setting. This allows effective review of the case notes, clinical discussion and an agreed provisional plan to be made. Patients can be seen via secure video calls on Attend Anywhere[2] and if clinical examination is needed a limited number of patients are brought for weekly face to face review clinics.

In the case of patients that need operations, a two week self-isolation protocol, combined with a COVID-19 antigen test at 72 h pre admission is conducted. Cleft specialist nurses review the patients at home pre-operatively (as in pre COVID-19 times), and also review at one and six weeks post operatively.

To ensure we were maintaining our high standard of care, those patients that have had direct contact with the service were surveyed. 35 consecutive patient families were surveyed using the Smart Survey website[3], with a 49% response rate.

100% of respondents were able to access their appointment easily, with 100% stating the appointment was at a convenient time. 94% of appointments were on time, with 100% of respondents feeling the appointment was an appropriate length of time. 91% of respondents felt they understood the proposed treatment plan for their child, and 100% of patients receiving a follow up letter understood their treatment plan. No respondents had any concerns regarding confidentiality. 83% were happy for their next appointment to be remote. 91% rated their consultation experience as good or very good with no respondents reporting a poor or very poor outcome. Advantages stated of the remote clinic model included ease of balancing work commitments, minimizing travel, no parking issues, and the ability for both parents to attend the consultation. Disadvantages stated included limitations in intra-oral examination, and concern about whether the technology would work prior to using it.

100% of those respondents that brought their children in for surgery felt that all appropriate precautions had been made to limit exposure to coronavirus, with clear guidance on PPE and hand washing on the ward. All respondents were able to isolate for the 2 week period prior to admission.

Patients felt well supported by the Cleft Specialist Nursing team, and 90% felt confident they could rely on their service in the case of any questions or emergencies. All respondents felt they had access to appropriate literature and other sources of information throughout.

Although the response rate was 49%, we feel this is representative of our patient cohort as a whole through informal qualitative feedback.

There remain teething difficulties in adopting new technologies, such as loss of internet service, limitations on the number of people dialling in to Attend Anywhere appointments and limited intra-oral examination ability. Despite this, the enforced changes have been positively received by our patients.

For the majority of infants presenting with cleft lip or cleft lip and palate, resolution is adequate on Attend Anywhere to make appropriate management decisions. However, for some children with isolated cleft palate such as Pierre-Robin sequence or incomplete clefts of uncertain significance, a face-to-face assessment is still required. As remote medical technologies improve, this may change.

Patients requiring alveolar bone grafting are also currently assessed remotely by the operating surgeon. The local orthodontists forward relevant medical photographs, radiographs and stone study models, allowing operative planning of surgical access and dental development to be undertaken.

Running a network multidisciplinary service prompts different challenges to a local one, specifically the numbers of clinical and non-clinical team members and travel challenges for clinicians and patients alike. This survey demonstrates the changes are perceived as safe and effective by our patients, and we therefore plan to continue this model for the duration of the pandemic. While some aspects of cleft care will always remain face to face, there may well be lessons we can learn from these enforced changes in how we continue to deliver the service after the pandemic has ended.

Funding

None

Ethical Approval

Not required

Conflict of Interest

None

References

1. Sandy JR, Williams AC, Bearn D, et al. Cleft lip and palate care in the United Kingdom-the Clinical Standards Advisory Group (CSAG) Study. Part 1: background and methodology. *Cleft Palate Craniofac J* Jan 2001;**38**(1):20-3.
2. https://england.nhs.attendanywhere.com
3. www.smartsurvey.co.uk

N A Brierley
Associate Professor
A G Smyth
Senior Resident
Northern & Yorkshire Cleft Lip and Palate Surgery Service, Leeds General Infirmary, Great George St, Leeds, LS1 3EX, USA
E-mail address: neil.brierley@nhs.net (N.A. Brierley)

https://doi.org/10.1016/j.bjps.2021.05.035

Universal ICG stage

COVID-19 and the Surveillance, Epidemiology, and End Results Program: Future considerations for skin cancer research

Dear Sir,

The coronavirus disease 2019 (COVID-19) pandemic has drastically impacted the care and management of patients with cutaneous malignancies.[1] Cancer databases are commonly used by clinician-researchers to analyze skin cancer outcomes at the population level and may provide insights into the downstream consequences of COVID-19 on skin cancer patients.[2] Among these is the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program, which collects data on cancer incidence, treatment, and outcomes from population-based cancer registries encompassing approximately 35% of the United States population.[3] Herein, we present considerations regarding the potential effects of COVID-19 on both skin cancer patient outcomes and researchers' ability to track these outcomes through SEER.

Many skin cancer patients likely experienced interruptions to their natural disease trajectory because of COVID-19. Pandemic-related disruptions to standard of care may influence outcomes such as stage at diagnosis, survival, and disease-specific death such that these outcomes become unrepresentative of skin cancers treated prior to the pandemic.[3] For example, fewer urgent skin cancer referrals have been reported during the pandemic,[4] suggesting that patients harboring undiagnosed skin cancer might present with more advanced disease. Delays in time to first definitive treatment for newly diagnosed patients may also result in further progression of disease.[4] These clinical care patterns may portend a population-level shift in the distribution of skin cancer stages recorded within SEER throughout the pandemic era relative to previous years. Cutaneous malignancies also most commonly occur in immunosuppressed and older individuals, which are also the demographics at higher risk of experiencing severe complications due to COVID-19.[1,5] Therefore, skin cancer patients infected by COVID-19 may have seen the natural history of their cancer altered by complications from the virus (e.g. hospitalization), also potentially influencing survival outcomes. Patients whose lives were lost prematurely to COVID-19 will eventually be recorded in SEER. These data will play a vital role in guiding our understanding of the downstream effects of treatment delays and COVID-19-related complications on outcomes for skin cancer.

It is yet unclear how SEER will adjust for COVID-19's effect on cancer outcomes, including skin cancer outcomes.

However, Hurricanes Katrina and Rita (August and September 2005, respectively) serve as a notable precedent. In the wake of these natural disasters, SEER excluded six months of data (from July to December 2005) for new cancer cases reported by the Louisiana Tumor Registry.[3] Given the much larger scale of the COVID-19 crisis, exclusion of all skin cancer cases diagnosed in 2020 does not seem to be a realistic solution. Furthermore, such an adjustment may detract from SEER's potential role in aiding public health research on cancer outcomes during and due to the pandemic. As we begin to recognize the long-term impacts of COVID-19 on skin cancer patients, the National Cancer Institute must adapt the SEER registry coding structure appropriately. Regardless of the COVID-19-related changes made within SEER, skin cancer researchers should note these adjustments as they occur and account for them in outcome analyses to mitigate any bias they might introduce.

Options for maintaining the research utility and integrity of the SEER Program in the post-pandemic era must be considered. One modification might involve providing COVID-19 as a listed cause of death in SEER. Based on current coding, COVID-19-related deaths would likely be categorized in SEER as "pneumonia and influenza" or "lungs and bronchus," both of which inadequately distinguish death due to COVID-19 from death due to similar causes.[3] Should this change be incorporated, researchers could then decide whether to exclude patients who died prematurely due to COVID-19 from their study design. Additionally, creation of a time to treatment variable in SEER may help differentiate skin cancer patients who experienced COVID-19-related treatment delays from those who did not.[4] Of note, time to treatment data is included in the National Cancer Database,[2] which serves as a reference for its potential incorporation into SEER. Rapid prospective implementation of coding structures in SEER that account for COVID-19's effect on skin cancer would prevent loss of valuable data informing its management and epidemiology. From a public health standpoint, we should recognize the ramifications of the pandemic on the treatment and care of skin cancer patients, as well as act preemptively to accurately characterize its influence on skin cancer behavior and outcomes in future database studies.

Financial disclosure

The authors report no funding sources relevant to this work

Ethical approval

Not required

Declaration of Competing Interest

The authors report no conflicts of interest relevant to this work

References

1. Baumann BC, MacArthur KM, Brewer JD, et al. Management of primary skin cancer during a pandemic: multidisciplinary recommendations. *Cancer* 2020;**126**(17):3900–6.
2. Tripathi R, Mazmudar RS, Knusel KD, Bordeaux JS, Scott JF. Big data in dermatology: publicly available health care databases for population health research. *J Am Acad Dermatol* 2020;**83**(5):1546–56.
3. Surveillance, Epidemiology, and End Results Program. National Cancer Institute. https://seer.cancer.gov/. Accessed January 27, 2021.
4. Rich H, O'Neill T. Major fall in urgent skin cancer referrals during the COVID-19 outbreak. *J Plast Reconstr Aesthet Surg* 2020.
5. Wells M, Jella TK, Zheng DX, et al. Impact of COVID-19 geographic distribution on advanced age plastic surgeons: a cross-sectional analysis. *J Plast Reconstr Aesthet Surg* 2020.

David X. Zheng[#], Christopher R. Cullison[#], Kathleen M. Mulligan
Professor and Head of Department
Case Western Reserve University School of Medicine, Cleveland, OH USA

Jeffrey F. Scott
Additional Professor and Head of Department
Department of Dermatology, Johns Hopkins University School of Medicine, Baltimore, MD USA
[#]DXZ and CRC share first authorship
E-mail address: dxz281@case.edu (D.X. Zheng)

https://doi.org/10.1016/j.bjps.2021.03.044

Universal ICG stage

The role of teleconsultation in the management of suspected skin malignancy in plastic surgery during COVID-19 outbreak: A single centre experience

Dear Sir

Introduction

The COVID-19 pandemic has had a profound impact on the provision of skin cancer treatment in the UK.[1] To preserve

the service, avoid diagnostic and treatment delays, whilst minimising patient exposure and risk of contracting COVID, the department transformed the outpatient skin cancer clinic into teleclinic service. This study examines the safety and efficacy of a teleclinic consultation, in comparison to a face-to-face consultation, in the assessment and surgical planning for patients referred to plastic surgeons with suspected skin cancer.

Methods

The study examined consecutive patients referred to a single plastic surgery consultant with a new suspected skin malignancy, assessed in consultations that took place in April-July 2020 (teleclinic consultations), or during the corresponding period in 2019 (face-to-face consultations). Patients were included in the study where a clinical diagnosis of skin cancer was made in the initial clinic appointment, and the patient listed for surgery through either the urgent (squamous cell carcinoma [SCC]/melanoma) or routine (basal cell carcinoma [BCC]) skin cancer pathways. Data was obtained from the electronic patient records (electronic document management system [EDMS]), examining clinic letter, the surgical procedure listing form, the operation note and histology report. Diagnostic accuracy was determined by comparing clinical diagnosis at the time of outpatient clinic with the histological diagnosis. Accuracy of surgical planning was evaluated as the proportion of patients correctly designated into the urgent or routine clinical pathways, as appropriate to their histological diagnosis. Chi-square test was used to determine statistical significance.

Results

The COVID-19 pandemic had an impact upon the number of new skin cancer referrals, and how the proportion of consultations were performed face to face or remotely (Figure 1). A total of 120 lesions in 98 patients were assessed, 55 patients in the face-to-face clinic cohort, and 43 patients in the teleclinic cohort. Demographic characteristics between the two cohorts were similar, with an average age of 71.8 ± 14.4 years and mostly Caucasian ethnicity (Table 1).

In comparison with face-to-face clinics, teleclinics comprised a lower proportion of patients with malignant lesions (65% versus 78.3%). The majority of cancers seen in face-to-face clinics were BCC (89%). There was a higher proportion of patients referred to teleclinic with SCC/melanoma (35%) in comparison to face to face (6.7%).

Diagnostic accuracy was better in face-to-face clinic compared to teleclinic; 85.0% and 63.6% respectively (χ^2 (1, $N = 120$) $= 7.35$, $p = 0.0067$). The diagnostic accuracy in teleclinic of lesions accompanied by photographs was slightly higher (66.7%) than those that did not (58.3%); however, this does not show statistically significant difference.

Teleclinic listed a higher proportion of patients to the urgent skin cancer pathway compared with face-to-face clinic (83.6% cf. 18.6%). The accuracy of listing patients on the correct pathway was also slightly higher for teleclinic patients. Of the teleclinic patients listed through the urgent pathway, 45.7% justified their urgent status, compared with 37.5% of those listed urgent in face-to-face clinic ($p = 0.67$). For those listed as routine, 100% of teleclinic patients and 96.8% of face-to-face clinic patients were listed appropriately.

More lesions (10.0%) listed via teleclinic had an "on the day" change in the nature of the surgical procedure from that anticipated in the initial listing form, compared with lesions listed via face-to-face (1.7%).

Discussion

The overall diagnostic accuracy for face-to-face consultation was higher than for teleclinic consultations, which is in agreement with most published studies.[2-4] Our results demonstrate that the accuracy of listing patients to the appropriate skin cancer pathway was similar between the two groups. Teleclinic substantially overestimated skin lesions to be urgent yet this did not occur to any greater extent than in face-to-face. Clinicians may be anxious about downgrading a potential SCC and delaying treatment. The overestimation in teleclinic was actually slightly lower than in face-to-face clinic, but this could in part reflect the higher proportion of patients presenting to teleclinic with SCC/melanoma during this period. In both groups the accuracy of routine booking is very high. There were no patients listed through teleclinics as routine pathway which turned out to be urgent.

During the pandemic the average number of days from referral to surgery did not increase and was within guidelines; 16.9 ± 15.1 and 70.3 ± 30.3 days for urgent and routine pathways, respectively. Indeed, digital image referral for skin malignancy has been reported to reduce the interval between referral and diagnosis.[5]

In conclusion, despite teleclinic having slightly reduced diagnostic accuracy, teleclinics show comparable accuracy in listing patients to urgent or routine skin cancer pathways. It offers convenience to patients in addition to reducing time to treatment and cost effectiveness. The lessons learned in the pandemic can be applied to the post-COVID healthcare environment.

Ethical approval

n/a.

Declaration of Competing Interest

none

Funding

n/a.

References

1. Nolan GS, Dunne JA, Kiely AL, Pritchard Jones RO, Gardiner M, Jain A, Nolan GS, et al., RSTNCOVID: Skin Collaborative The effect of the COVID-19 pandemic on skin cancer surgery in the United Kingdom: a national, multi-centre, prospective cohort study and survey of Plastic Surgeons. *Br J Surg* 2020;**107**(12):e598–600.
2. Chuchu N, Dinnes J, Takwoingi Y, Matin RN, Bayliss SE, et al. Teledermatology for diagnosing skin cancer in adults. *Cochrane Database Syst Rev* 2018;**12**(12).
3. Finnane A, Dallest K, Janda M, Soyer P. Teledermatology for the diagnosis and management of skin cancer. A systematic review. *JAMA Dermatol* 2017;**153**(3):319–27.
4. Wolner ZJ, Yélamos O, Liopyris K, Rogers T, Marchetti MA, Marghoob AA. Enhancing skin cancer diagnosis with dermoscopy. *Dermatol Clin* 2017;**35**(4):417–37.
5. Tadros A, Murdoch R, Stevenson JH. Digital image referral for suspected skin malignancy – a pilot study of 300 patients. *J Plast Reconstr Aesthet Surg* 2009;**62**(8):1048–53.

Kantida Koysombat
Associate Professor
Agata M Plonczak
Senior Resident
Christian A West
Professor and Head of Department
The Mersey Regional Burns and Plastic and Reconstructive Surgery Unit, Whiston Hospital, Warrington Rd, Rainhill, Prescot L35 5DR, United Kingdom
E-mail address: agata.plonczak@gmail.com (A.M. Plonczak)

https://doi.org/10.1016/j.bjps.2021.03.003

Universal ICG stage

Microsurgical training pre-and post-COVID 19: Is there a re-learning curve and lessons for lockdown three

Dear sir,

The breast unit at the Queen Victoria Hospital in East Grinstead covers a population of 4.6 million in the South East of England and is one of the busiest in the UK, with 294 breast free flaps performed in 2018.[1] As a result of the COVID-19 lockdown QVH became a designated cancer-hub, providing theatre facilities to eight other NHS Trusts in the South East to undertake urgent priority level I and II procedures.[2] In line with national guidance microvascular breast reconstruction procedures were suspended in mid-March 2020 and not resumed until mid-August 2020, a gap of five months.

We have undertaken a review of our breast free flap activity for the 15-month period from September 2019 to November 2020, split into two cohorts, pre-lockdown from September 2019-March 2020, and post-lockdown from August-November 2020. Numerous professional bodies, including the JCST, BAPRAS and the RCS have highlighted concerns regarding missed training opportunities as a result of COVID-19.[3] We have aimed to investigate the impact of this five-month suspension on training opportunities and operative timings for microvascular breast reconstruction.

Pre-lockdown we performed 172 flaps in 129 patients (5.9/week) and 70 flaps in 53 patients post-lockdown (5/week); 40% of these were immediate reconstructions pre-lockdown against 34% post-lockdown (NS, Fisher's Exact test). The most common reconstruction was the DIEP, accounting for 85% of cases pre-lockdown, of which 23% were bipedicled cases, and 77% post-lockdown, 20% of which were bipedicled. Pre-lockdown 41% of patients had bilateral reconstructions versus 49% post-lockdown. Consequently, our case mix and complexity were broadly comparable during the two time periods.

We have found no significant differences in either anaesthetic, or surgical time during the two time periods; there was a small, but statistically significant decrease in both flap raise time and ischaemia times during the post-lockdown period, as summarised in Table 1.

Regarding training opportunities, Figure 1 summarises our data for the number of microvascular anastomoses (arterial and venous) broken down by practitioner grade. There was a small increase in the proportion of anastomoses performed by consultants, but non-consultants still performed nearly 40% of all anastomoses during the post-lockdown period. For flap raise, there was an increase in the proportion of flaps raised by consultants post-lockdown from 34% to 70%, with the number raised by fellows reducing from 53% to 27%.

It is therefore logical to assume that the reductions in operation time, particularly for flap raise and ischaemia time are simply a product of a greater number of these tasks being undertaken by consultants post-lockdown. However, we have found all three surgical grades were slightly quicker during the post-lockdown period, with this increased speed reaching statistical significance for the microsurgery fellow grades (student's *t*-test):

- Consultant Ischaemia Time: 45.6 min pre; 43.4 min post, NS.
- Fellow Ischaemia Time: 60.5 min pre; 52.5 min post, $p = 0.03$.
- Registrar Ischaemia Time: 57.7 min pre; 55.1 min post, NS.

The final change in our unit's practice post-lockdown was an increase in levels of two-consultant operating for free flap procedures. Prior to lockdown only 2/129 cases

This work has not been presented.

Table 1 Operative timings pre- and post-lockdown (all values in minutes).

	Anaesthetic Time	Surgical Time	Flap Raise Time	Flap Ischaemia Time
Pre-Lockdown	496	448	54	132
Post-Lockdown	466	432	49	112
p-value	NS	NS	0.043	0.017

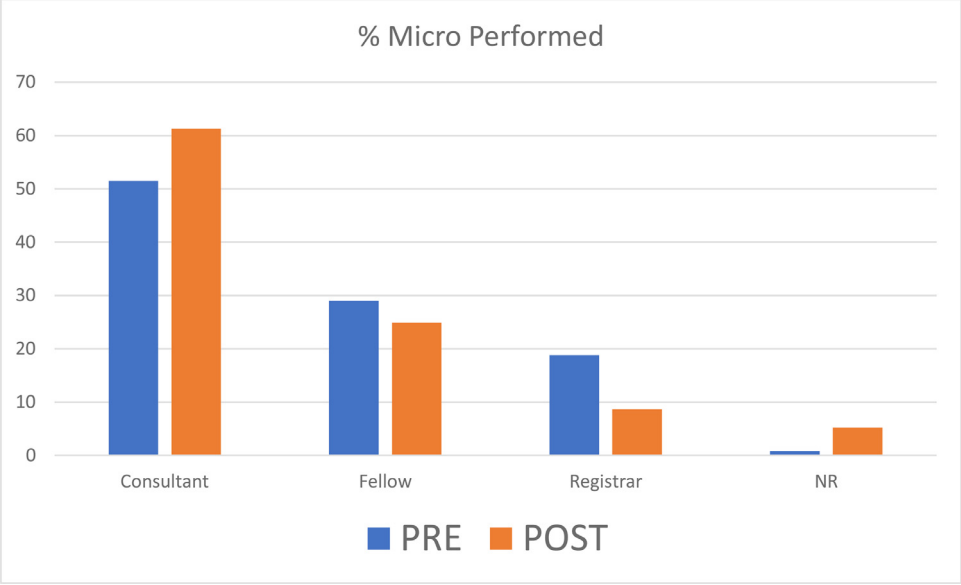


Figure 1 Proportion of microvascular anastomoses performed by surgeon grade.

were undertaken with two-consultants; post-lockdown this increased to 14/53 cases, of which 10 were bipedicled or bilateral cases. There was no statistically significant difference in anaesthetic or surgical time between one- and two-consultant operating for either unilateral or bilateral/bipedicled cases.

In summary, our experience of resuming microvascular free flap reconstruction following a five-month suspension has been extremely positive. Over the time period studied our flap failure rate was 0% for both the pre- and post-lockdown periods, consistent with a very high performing unit.[4] We were able to rapidly resume a large amount of microvascular breast free flap work, averaging 5 free flaps each week. With this resumption of a high microsurgical volume we have been able to maintain a good level of training for both fellows and registrars, who continue to undertake nearly 40% of all microvascular anastomoses; although there has been an increase in the number of flaps raised by consultants. In part this has been due to an increase in two-consultant operating cases, in line with Trust guidelines during service restoration. Interestingly, we did not find that the involvement of two consultants increased the speed of operations, and anecdotally all consultants in our Unit reported that the presence of another colleague made them more relaxed about giving training opportunities to juniors.

With the introduction of the UK's third national lockdown in late December 2020 and huge pressure on NHS services as a result of COVID-19 there will doubtless be further major disruption to breast reconstruction services, but our experience demonstrates that services can be resumed rapidly, with the maintenance of high levels of free flap success (100%) whilst continuing to offer substantial training opportunities to junior surgeons.

Ethical approval

N/A.

Declaration of Competing Interest

None.

Funding

None.

References

1. Henton J, Berner JE, Blackburn A, Molina A. Microsurgical training opportunities at the Queen Victoria Hospital. Ann Plast Surg 2020;**84**(6):e27–8.
2. https://www.qvh.nhs.uk/2020/04/queen-victoria-hospital-becomes-designated-cancer-centre-for-south-east-during-covid-19-pandemic /(last accessed 10th January 2021).
3. Burke D. The impact of COVID-19 on surgical training. Bull R Coll Surg Engl 2020;**102**(S1):p3.

4. Sindali K, Jones M. Improved patient outcomes using the enhanced recovery pathway in breast microsurgical reconstruction: a UK experience. *JPRAS Open* 2018;**19**:24–34.

D.R. Thomson
Associate Professor
M.E. Jones
Senior Resident
Department of Plastic Surgery, Queen Victoria Hospital, East Grinstead RH17 3DZ, UK
E-mail address: d.thomson5@nhs.net (D.R. Thomson)

https://doi.org/10.1016/j.bjps.2021.03.110

Universal ICG stage

Resident experiences with virtual education during the COVID-19 crisis

Dear Sir,

Introduction

There has been a large shift to the use of web-based videoconferencing platforms to facilitate distance learning for surgical residents during the COVID-19 pandemic[1–3]. Plastic surgery has been at the forefront of virtual education by utilizing videoconferencing technology to develop new education programs[3], including the American Society for Plastic Surgery (ASPS) Virtual Grand Rounds, Aesthetic Surgery Journal (ASJ) Virtual Grand Rounds and Global Education Meetings (GEMS), International Microsurgery Club webinars, and others. These are in addition to virtual conferences developed by individual residency programs and multi-institutional virtual visiting professorships. Virtual conferences now play a significant role in resident education; however, there is concern that overuse of this modality may lead to educational burnout.

Methods

An anonymous web-based survey was distributed to the University of Washington Integrated Plastic Surgery Residency Program (UW PRS) in May 2020. Different aspects of resident experiences with virtual conferences were assessed. A modified Maslach Burnout Inventory was used to assess burnout from virtual conferences. This study was IRB exempt. Paired two-tailed t-tests were used to compare maximal versus current conference attendance and reasons for missing videoconferences.

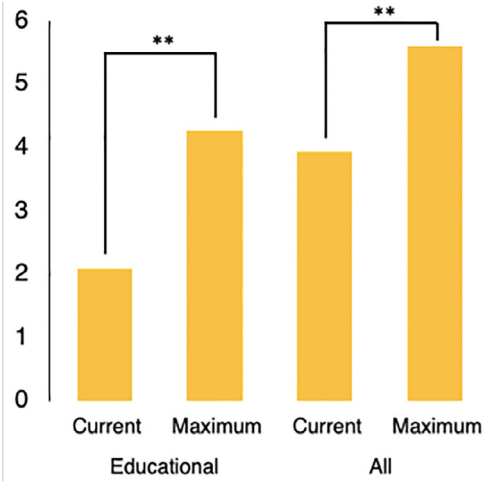


Figure 1 (A) Current and maximum resident weekly attendance at virtual education meetings versus all virtual meeting use; (B) resident reasons for missing virtual education opportunities; (C) modified Maslach Burnout Inventory assessment of resident virtual education experiences (top); resident behavior and attitudes toward virtual education experiences (bottom).

Results

The survey response rate was 100% ($n = 24$). There were varying degrees of awareness of the virtual educational opportunities available. The UW PRS weekly educational conference (96%), multi-institutional ground rounds (92%), ASPS Virtual Grand Rounds (96%), and the ASJ Virtual Grand Rounds (88%) had the highest rates of resident awareness, likely as these were the earliest established and most publicized. Almost all conferences occurred during the mornings throughout the week, and all educational conference sessions were recorded and available for viewing the same day. In all, there were over 10 h per week of virtual education lectures available to residents. Resident attendance was not tracked by the program, other than for weekly residency program conferences.

All residents attended a combination of administrative, social, and educational videoconferences. There was a significant decrease in the average number of total weekly videoconferences attended by residents (5.58 initial vs 3.92 current, $p<0.01$) throughout the COVID response. There was a significant decrease in total plastic surgery-related virtual educational meeting participation over time (4.25 initial versus 2.08 current, $p<0.01$) (Figure 1). Reasons for decreased attendance were clinical duties (92%) followed by manifestations of burnout: forgetfulness (67%) and feeling fatigued by the online lectures (54%).

The modified Maslach Burnout Inventory demonstrated that residents were developing negative associations with educational videoconferences (Figure 2). 88% of residents reported feeling very frequently or occasionally burned out

	Always	Very Frequently	Occasionally	Rarely	Never
I feel used up/worn out at the end of the day.	0%	17%	71%	8%	4%
Interacting with people on videoconferencing is energizing and relaxes me.	4%	4%	25%	54%	13%
I feel emotionally drained/exhausted from videoconferencing.	0%	25%	54%	21%	0%
I feel exhilarated/inspired by participating in virtual educational conferences.	4%	17%	33%	46%	0%
I feel burnt out by the number of videoconference activities.	4%	46%	38%	8%	4%

	Always	Very Frequently	Occasionally	Rarely	Never
Do you take notes during conference?	8%	21%	33%	17%	21%
Do you perform other activities while listening/watching educational conferences?	4%	17%	54%	21%	4%
If you miss a conference, how frequently do you watch it later if it's recorded?	0%	13%	33%	38%	17%
Do you feel like virtual conferences are useful/educational?	17%	42%	42%	0%	0%

Figure 2 Modified Maslach Burnout Inventory assessment of resident virtual education experiences (top); resident behavior and attitudes toward virtual education experiences (bottom).

due to the number of virtual educational activities. 79% of residents reported feeling at least occasionally emotionally drained and exhausted from videoconferencing.

Despite declining attendance and burnout, most residents believed that the videoconferences should continue after the end of social distancing but felt a reduced number would be ideal with an average recommendation of 1.32 per week (Figure 2).

Discussion

Overall, residents have favorable attitudes towards the incorporation of virtual educational conferences. These opportunities afford residents educational material not available within their institution, access to experts in the field, and occasions for career networking. This study shows however that residents are experiencing "videoconference fatigue" or "videoconference burnout". Distance learning is associated with social isolation which leads to depersonalization and burnout[4]. Videoconferencing also results in the distortion or loss of nonverbal cues, subsequently requiring greater focus and energy than in-person interactions. Group activities may be more difficult as the time lags and other features of videoconferencing have been shown to lead to decreased engagement and trust[5]. These effects are further compounded by the general anxiety and stress surrounding the COVID-19 pandemic and from prolonged social isolation.

Approaches to fight this "videoconference burnout" include creating fun, social outlets for residents such as "virtual happy hours" to foster a more positive association with this technology. Incorporating more interactive elements, such as discussions and debates, can increase engagement. Efforts should be made to maximize quality and coordination among content producers to create a more structured and unified curriculum may be beneficial.

A limitation of this study is that it focused on a single academic plastic surgery program, which could limit its generalizability. However, the resident cohort includes a broad range of backgrounds, clinical interests, and learning styles so the study findings are likely still relevant to all surgical residents. Further investigation, such as semi-structured interviews with residents, to evaluate the experiences of a broader group of residents will shed further light on "videoconference burnout" and how to mitigate its effects.

Conclusions

Residents are interested in continued virtual learning opportunities but in a more limited quantity. "Videoconference burnout" experienced due to the high concentration of these videoconferences during the COVID-19 pandemic has decreased resident engagement. These virtual lectures are not a panacea for surgical education nor a replacement for in-person or experiential learning and should serve as adjuncts to existing educational curricula.

Financial disclosure statement

The authors have no conflicts of interest to disclose. No funding was obtained for this study.

Ethical approval

Not required

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2021.05.037.

References

1. Daodu O, Panda N, Lopushinsky S, et al. COVID-19 - considerations and implications for surgical learners. *Ann Surg* 2020;**1**.
2. Chick RC, Clifton GT, Peace KM, et al. Using technology to maintain the education of residents during the COVID-19 pandemic. *J Surg Educ* 2020 Epub ahead of print. doi:10.1016/j.jsurg.2020.03.018.
3. Wlodarczyk JR, Wolfswinkel EM, Carey JN. COVID-19 video conferencing: preserving resident education with online meeting platforms. *Plast Reconstr Surg* 2020;**1**.
4. Ried LD, Motycka C, Mobley C, et al. Comparing self-reported burnout of pharmacy students on the founding campus with those at distance campuses. *Am J Pharm Educ* 2006;**70**:114.
5. Schoenenberg K, Raake A, Koeppe J. Why are you so slow? – Misattribution of transmission delay to attributes of the conversation partner at the far-end. *Int J Hum-comput St* 2014;**72**:477–87.

Jenny L. Yu[#]
Associate Professor
Daniel Y. Cho[#]
Senior Resident
Rebecca L. DeSanti
Professor and Head of Department
Cameron J. Kneib
Additional Professor and Head of Department
Jeffrey B. Friedrich
Vice President
Shannon M. Colohan
Division of Plastic Surgery, Department of Surgery, University of Washington, Harborview Medical Center, 325 9th Ave. Mailstop #359796, Seattle, WA 98104, United States
[#]Both authors contributed equally to this work.
E-mail address: dcho85@uw.edu (D.Y. Cho)

https://doi.org/10.1016/j.bjps.2021.05.037