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.

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Correspondence and Communications

Engineering a Future with VCA: Applying Genetic Circuits to Engineer Tissues for Vascularized Composite Allotransplantation

Dear Sir,

Vascularized composite allotransplantation (VCA) has seen tremendous technical success in our specialty spanning across multiple tissue types, including hand, face, penis, and lower extremity. However, technical excellence in the structural transplantation cannot override the necessity for immune system modulation for long-term maintenance of function. This hurdle has yet to be tackled successfully, with the risks of lifelong immunosuppression, limiting the success of VCA to a very select group of patients and oftentimes tarnishing the otherwise superb surgical results of the transplanted tissue.[1]

As highlighted by Roh and Liao in 2018, there is a realm of untapped potential in the field of plastic and reconstructive surgery through the lens of the clustered regularly interspaced short palindromic repeats (CRISPR) and CRISPR-associated DNA nuclease (Cas) systems of genome editing.[2] This innovative technology has the potential to enhance the entire scope of our specialty, currently limited only by our understanding of the exact inherent pathophysiologic mechanisms driving disease and dysfunction.[3] Specifically, this technology can potentially be utilized to modulate the body's immune response through the activation of targeted transcription factors driving these signaling cascades.

Engineering synthetic tissues can employ the objectives of personalized medicine. For example, engineering synthetic adipose tissue for regulating blood glucose levels in diabetic patients is likely to be a reality in the near future.[4] In this theoretical, personalized therapy, adipose cells can be programmed with genetic circuits capable of sensing circulatory glucose levels and will trigger a response by secreting a tightly regulated amount of insulin. Imagine this application of genetic circuit engineering in progenitor immune cells in recipients of VCA. This would effectively control the body's intrinsic immune response to exactly the level necessary to maintain homeostatic immune function without driving rejection of the foreign transplanted tissue.

Synthetic biologists have made great strides in engineering novel genetic tools to tightly regulate gene expression in a variety of cell and tissue types. These genetic tools have been used for directing stem and progenitor cell differentiation to produce desired cell lineages, to make organoids, and to engineer therapeutic cells to sense and respond to disease states.[5] Engineered therapeutic cells endowed with genetic circuits have the potential to transform basic science and medicine. Using genetic circuits to tightly control the expression of transcription factors has shown to significantly improve differentiation outcomes and may provide a scientific basis for modulation of immune system cells involved in acute, sub-acute, and chronic VCA tissue rejection.

With improvements to controlling gene expression in cells that continue to be built by synthetic biologists, our specialty has an opportunity to push the envelope of cell engineering possibilities applied directly to the roadblocks associated with VCA. These efforts can effectively transform the capabilities of contemporary VCA techniques, allowing for the precise modulation of immune response and expansion of application of this life-enhancing surgical intervention.

Disclosures

The authors have nothing to disclose.

References

1. Diaz-Siso JR, et al. Vascularized Composite Allotransplantation: Alternatives and Catch-22s. *Plast Reconstr Surg* 2018;**142**(5):1320–6.
2. Roh DS, Li EB, Liao EC. CRISPR Craft: DNA Editing the Reconstructive Ladder. *Plast Reconstr Surg* 2018;**142**(5):1355–64.
3. Hu MS, Longaker MT, Wan DC. Discussion: CRISPR Craft: DNA Editing the Reconstructive Ladder. *Plast Reconstr Surg* 2018;**142**(5):1365–6.
4. Healy CP, Deans TL. Genetic circuits to engineer tissues with alternative functions. *J Biol Eng* 2019;**13**:39.
5. Stapleton JA, et al. Feedback control of protein expression in mammalian cells by tunable synthetic translational inhibition. *ACS Synth Biol* 2012;**1**(3):83–8.

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Peripheral nerve regeneration: The resolution revolution

Dear Sir,

Peripheral nerve injury is common and results in great cost to the individual and society.[1] Despite the innate potential for regeneration, healing following nerve injury is slow and often incomplete, resulting in life altering functional deficit. Advances seen in tissue engineering approaches have to date failed to translate from preclinical models at a meaningful rate for patients, the bioengineered repair guides currently available do not adequately recreate the nerve repair cell niche.[2] There is a need to further understand nerve repair at the molecular and cellular level in order to improve outcomes for patients.[3]

The recent rapid development and production of high throughput gene assays may allow for higher resolution molecular understanding, and analysis of the genomic heterogeneity within different cell types of injured and pathological nerve specimens. This offers an opportunity for comparative analysis of the molecular control of nerve injury, healing and disease states. We should harness and direct these new technologies to the benefit of our plastic and reconstructive patients.

Recent work has added to our understanding of the molecular mechanisms controlling nerve injury and importantly regeneration. Tissue engineering models of peripheral nerve injury have identified the importance of CRAT, MAP3K and mTORC2 pathways in the response of regenerating nerve cells to mechanical cues.[4] Interestingly somatic activating mutations in the phosphatidylinositol-3-kinase (PiK3CA)/AKT/mTOR pathway underlie heterogeneous segmental overgrowth phenotypes, these have been named PiK3CA related overgrowth syndromes (PROS) and include macrodactyly. The mTOR pathway is also implicated in peripheral nerve sheath tumours.

In addition to providing causative explanation for congenital upper limb anomalies, increasingly studies demonstrate causal genes in acquired upper limb peripheral nerve pathologies. A recent genome wide association study identified a number of likely causal genes in carpal tunnel syndrome, including adipocyte enhancer binding protein 1 (AEBP1).[5] Interestingly AEBP1 is known to promote tumourgenesis via (PiK3CA)/AKT/mTOR pathway in glioma and melanoma.[6]

Future work should focus on establishing the required work streams to compare the molecular and cellular niche of the nerve injury environment with that of nerve related overgrowth syndromes and tumours. A rapid route to clinical impact would be repurposing of existing drugs to target these molecular pathways. Adipose tissue presents both a useful mesenchymal derived cell for biological comparison in polyomic study designs and a potential therapeutic adjunct. Further understanding of the delicate cellular and molecular processes will provide the next frontier of peripheral nerve tissue engineering.

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Declaration of Competing Interest

None declared

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Ethical approval

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References

1. Bergmeister KD, et al. Acute and long-term costs of 268 peripheral nerve injuries in the upper extremity. *PLoS ONE* 2020;**15**(4):e0229530.
2. Thomson SE, Déjardin T, Tsimbouri M, Hart AM, Riehle MO. Combinational approaches to improve outcomes following peripheral nerve repair. *J Plast Reconst Aesthetic Surgery* 2014;**67**(10):1465.
3. Hart A, Terenghi G, Wiberg M. Tissue engineering for peripheral nerve regeneration. In: Pallua N, Suschek CV, editors. *Tissue Engineering: From Lab to Clinic*. Berlin Heidelberg: Springer-Verlag; 2011. p. 245-62. Editor.
4. Thomson SE, et al. Microtopographical cues promote peripheral nerve regeneration via transient mTORC2 activation. *Acta Biomater* 2017.
5. Wiberg A, et al. A genome-wide association analysis identifies 16 novel susceptibility loci for carpal tunnel syndrome. *Nat Commun* 2019;**10**(1):1030.
6. Majdalawieh AF, Massri M, Ro HS. AEBP1 is a novel oncogene: mechanisms of action and signaling pathways. *J Oncol* 2020;**2020**:8097872.

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Utilising multiplex PCR technology for rapid microbial diagnosis in hand and upper limb infections

Dear Sir,

Infections affecting the hand and upper limb are commonly managed by tertiary hand surgery units.[1] These can be broadly classified into either bone and joint infections or skin and soft tissue infections. Often, there is significant variation in clinical presentation and current available microbiological diagnostics can be of limited value.[1] This may result in delayed definitive treatment or inaccurate diagnosis that could prolong hospitalisation or, in the worst case scenario, produce a life or limb threatening situation.[1]

In addition to limb elevation, splinting, adequate surgical drainage, and/or, debridement, microbiological sampling with targeted antimicrobial therapy forms the mainstay of management for hand infections. Traditional microscopy and culture is the current gold standard microbiological diagnostic process, but often takes 48-72 hours before a specific pathogen and susceptibility profile are identified. This may result in adverse outcomes particularly in severe infective hand conditions such as flexor sheath tenosynovitis, fight bites or necrotizing fasciitis.

Real-time Multiplex polymerase chain reaction (mPCR) is an established microbiological diagnostic method that detects the presence of DNA from several different bacterial targets simultaneously. Within a matter of hours this technology is able to detect organisms and in some instances provide evidence of antimicrobial resistance genes. mPCR has demonstrated benefits in diagnosis and treatment time compared to traditional culture based methods in a range of applications, including respiratory infections, bacteraemia in sepsis, and prosthetic joint infections.[2-4] However, mPCR does present higher costs compared with standard culture.

Presently, there is no published literature concerning the use of mPCR technology in the management of hand and upper limb infections. The potential benefits are clear although formal cost-analysis ought to be undertaken. Earlier identification of causative organisms in these cases is likely to result in less visits to the operating theatre for repeated washouts and reduced length of inpatient stay. This may offset the additional costs associated with this technology from a whole healthcare perspective. Following the coronavirus pandemic, many institutions may have molecular platforms able to be repurposed to wider infection diagnostics. As clinical teams have more ready access to mPCR, hand surgery teams should leverage this opportunity to utilise rapid diagnostics when managing severe hand infections.

Declaration of competing Interest

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References

1. Koshy JC, Infections Bell BHand. *J Hand Surg Am* 2019;**44**(1):46-54.
2. Andrews D, Chetty Y, Cooper BS, et al. Multiplex PCR point of care testing versus routine, laboratory-based testing in the treatment of adults with respiratory tract infections: a quasi-randomised study assessing impact on length of stay and antimicrobial use. *BMC Infect Dis* 2017;**17**(1):671.
3. Fitting C, Parlato M, Adib-Conquy M, et al. DNAemia detection by multiplex PCR and biomarkers for infection in systemic inflammatory response syndrome patients. *PLoS One* 2012;**7**(6):e38916.
4. Malandain D, Bemer P, Leroy AG, et al. Assessment of the automated multiplex-PCR Unyvero i60 ITI® cartridge system to diagnose prosthetic joint infection: a multicentre study. *Clin Microbiol Infect* 2018;**24**(1) 83 e1-6.

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Secondary acellular dermal matrix application to integrated primary acellular dermal matrix in implant-based breast reconstruction

Dear Sir,

The number of breast reconstructions has been increasing in parallel with the increasing number of mastectomies due to breast cancers. There are several methods for breast reconstruction, including implant-based breast reconstruction (IBR), autologous tissue-based breast reconstruction, or a combination of both.[1] IBR is preferred in slim patients without adequate autologous tissue for breast reconstruction, especially, in oriental women.

Acellular dermal matrices (ADMs) are commonly used in implant-based breast reconstruction to supplement the lack of the pectoralis muscle.[2] Two-staged breast reconstruction with a tissue expander is usually performed in a patient who undergoes a total mastectomy sacrificing the nipple areola complex and the regional skin. Lack of skin is supplemented with a skin expansion procedure. While performing skin expansion procedure, the skin becomes thin, especially in the lower pole of the breast. Sometimes, at the time of implant exchange, an orientation mark on the lower pole in a breast implant can be palpated and visible as if having a lump on the skin surface. In this situation, fat graft can be chosen to increase the thickness of skin flap to mitigate the visibility of the orientation mark. However, it is not easy to harvest fat tissue enough to cover the entire breast skin flap in the case of very slim patients. Furthermore, we noted its visibility but unable to acquire patient's permission for fat graft during the operation. This is why we tried to add an additional sheet of ADM to the undersurface of the integrated primary ADM. In this manner, we enhanced the thickness of the skin flap in patients who have very thin expanded mastectomy flap.

Table 1 Postoperative outcomes.

	Primary operation	Secondary operation
No. of breasts	12	12
No. of complications	4 (33.3%)	0
Hematoma	2 (16.7%)	0 (0%)
Seroma	0 (0%)	0 (0%)
Wound dehiscence	1 (8.3%)	0 (0%)
Flap necrosis	1 (8.3%)	0 (0%)
Infection	0 (0%)	0 (0%)
Reconstructive failure	0 (0%)	0 (0%)
Drain, *days*		
Mean (±SD)*	10.3 ± 4.2	5.5 ± 2.0
Median	9.0	6.0

* $p<0.05$ statistical analysis; Student's *t*-test.

Between October 2016 and December 2017, secondary ADM (MegaDerm®™ L&C BIO, Seongnam, South Korea) applications were performed in 11 breasts of 9 patients that planned to undergo implant exchange after tissue expansion. Before application the secondary ADM to the under surface of the primary ADM, Microneedling with 2 mm needle mesoroller (Derma-Q, Dongbang Medicare, Seongnam, South Korea) was performed on the undersurface of the primary ADM that was integrated to the skin flap, to secure circulation to the secondary ADM sheet, until pin point bleeding from the undersurface of the skin flap was supplemented with the primary ADM.

Most patients had a low body mass index (BMI), that was around 21 and ranged from 18.9 to 24.9 (median BMI 20.94). The average length of follow-up was 10.8 ± 3.47 months after implant exchange. The initial inflation volume of a tissue expander was 216.26 ± 74.47 ml and the final inflation volume was 373.64 ± 85.59 ml. The mean area of the primary ADM was 109±18 cm^2 and the area of the secondary ADM was 70±12 cm^2. The smaller secondary ADM was confined to the larger primary ADM area. Postoperative outcomes are summarized in Table 1. None of the cases had associated complications such as seroma, hematoma, infection, flap necrosis and reconstructive failure after implant exchange. The number of drain maintenance days after implant exchange (5.5 ± 2.0 days) were shorter than those after tissue expander insertion (first stage operation). Ultrasonographic examination showed that the layer

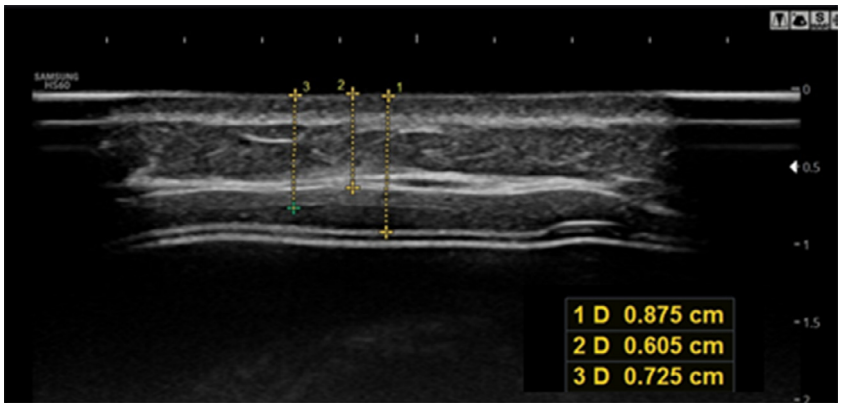

Figure 1 Postoperative ultrasonographic finding: the primary and secondary ADMs were well-incorporated under the subcutaneous fat tissue layer. Total thickness of the skin flap was increased and a distinction between the primary and the secondary layer was noted. 1. Thickness of entire skin flap, 2. Thickness of skin flap without ADM layers, 3. Thickness of skin flap and primary ADM layer.

of subcutaneous fat tissue had thinned at the time the tissue expansion procedure was completed. At postoperative 4–6 months after the permanent breast implant exchange, the thickened subcutaneous fat layer was found between the skin and the ADM layers in most patients The primary and secondary ADM sheets were well-incorporated between the subcutaneous tissue and the breast implant. We also found that the two ADM layers were incorporated each other in all cases and the primary and secondary layers were distinguishable in one case (Figure 1). The entire skin flap thickness was increased (mean amount of increase; 3.43± 0.67 mm) (supplement material). Because the thickness of each layer (subcutaneous fat tissue layer, primary and secondary ADMs layer) showed irregularity in the same patient, it was not feasible to evaluate the thickness of each layer. Generally, the entire skin flap thickness, including the skin, subcutaneous tissue and the two ADMs layer, increased according to ultrasonographic findings.

The application of an additional ADM sheet to overlap the primary ADM sheet in IBR remains challenging but can be an another option to increase the thickness of skin flap without additional invasive procedure such as fat grafting.

Disclosure

The author has no financial interest to declare in relation to the content of this article.

Declaration of Competing Interest

There is no conflict of interest.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2020.05.049.

References

1. Jagsi R, Jiang J, Momoh AO, et al. Trends and variation in use of breast reconstruction in patients with breast cancer undergoing mastectomy in the United States. *J Clin Oncol* 2014;**32**:919-26.
2. JoAnna Nguyen T, Carey JN, Wong AK. Use of human acellular dermal matrix in implant-based breast reconstruction: evaluating the evidence. *J Plast Reconstr Aesthet Surg* 2011;**64**:1553-61.

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Safety of Fleur-de-lis Abdominoplasty after Massive Weight Loss

Dear Sir,

Global estimates suggest that there are approximately 500 million obese adults worldwide.[1] With an increasing number of patients undergoing bariatric surgery, there is an increasing demand for body-contouring. The most common

complaint in this patient population is abdominal contour deformities.[2,3] Unlike the typical abdominoplasty patient that has an excess of skin and fat in the vertical dimension, the massive weight loss patient may have excess in both the transverse and vertical dimensions. First described in 1967, the Fleur-de-lis (FDL) abdominoplasty allows the surgeon to address excess tissue in both the transverse and vertical axes.

There remains debate about the safety of FDL abdominoplasty. The purpose of this study was to evaluate the safety profile of FDL abdominoplasty after massive weight loss.

Methods

A retrospective review of the senior author's (J.W.T.) body contouring cases from 2010-2016 was performed. All patients that underwent FDL abdominoplasty were included. All post-operative complications were documented and were categorized as either minor or major. Minor complications included wound dehiscence, seroma, hematoma, wound infection, minor skin necrosis, and need for scar revision. Complications that required operative intervention or admission to hospital (within 30 days) were considered major complications.

Statistical Analysis

Summary statistics were generated for all variables. Multivariate linear regression models were developed to identify risk factors for post-operative complications, and included patient sex, age, presence of subcostal scar, BMI, the incidence of diabetes, hypertension, total number of co-morbidities, number of concurrent procedures being performed, and whether liposuction was performed. Dependent variables included minor skin necrosis, and rate of minor, major and cumulative number of complications.

Results

Patient Demographics

A total of 111 consecutive patients (mean age 48 years; n=106/111, 95% female) undergoing FDL abdominoplasty were identified. Mean BMI at the time of operation and change in BMI was 30.45 and 22, respectively.

Complications

Minor complications were identified in 37 cases (33%). A total of 8 patients (7.2%) had a major complication. The rate of minor skin necrosis was significantly higher in patients with previous subcostal scar ($p<0.05$) (Table 1).

Table 1 Complication profile of FDL abdominoplasty.

Complications (not mutually exclusive)	Frequency (%)
Minor (non-operative)	
Dehiscence	8 (7%)
Seroma	2 (2%)
Wound infection	4 (4%)
Skin necrosis	21 (19%)
Hematoma	1 (1%)
Scar revision	8 (7%)
Major (operative)	
Seroma cavity (excisional)	0
Hematoma	0
Dehiscence	3 (3%)
Skin necrosis	4 (4%)
Total umbilical necrosis	0
Abscess (requiring drainage)	2 (2%)
Venous Thromboembolism	0

Risk Factors

The incidence of minor complications ($F(12, 98) = 2.61$, $p=0.005$, $R^2 = 0.24$) was found to be associated with the greater number of concurrent procedures being performed (95% CI, 0.01-0.14; p=0.03).

Diabetes mellitus (95% CI, 0.06 - 0.39, p=0.008) and dyslipidemia (95% CI, 0.35 - 0.85, p<0.001) were both independent risk factors for developing wound dehiscence. Hypertension was associated with the development of minor wound infection (95% CI, 0.05 - 0.27, p=0.007) and minor skin necrosis (95% CI, 0.03 - 0.48, p=0.029). The greater number of concurrent procedures (95% CI, 0.01-0.13, p=0.019) and a greater change in BMI (95% CI, -0.02 - 0.00, p=0.034) was also found to be associated with the development of minor skin necrosis (Table 2).

Discussion

The safety profile of FDL abdominoplasty is not well described in the literature. The most common complications encountered are wound dehiscence, hematoma, infection, seroma and skin necrosis.[4] The overall complication rates reported herein are within the range of previously reported studies. Our rate of minor post-operative complications was in large part driven by a higher rate of minor skin necrosis in patients with previous subcostal scar. These results however, are limited by small sample size (n=11). These authors believe subcostal scar should not be considered an absolute contraindication to FDL abdominoplasty if during the vertical resection, bevelling towards the midline is undertaken. This allows for maximal preservation of perforators beyond the resection margins. When a subcostal scar exists, extra care should be taken to preserve all perforators caudal to the scar. To minimize risk of umbilical necrosis and potential wound breakdown, the umbilical stalk should be created with a small amount of surrounding fat. It should be appropriately shortened prior to inset.

Although combined abdominoplasty procedures have been shown to be safe and effective in carefully selected patients, we identified an increased incidence of minor complications, confirming previous reports.[5] Specifically, we found an increase in the rate of minor skin necrosis. In addition to skin necrosis, published rates of wound

Table 2 Multivariate regression models examining the incidence of minor, major and cumulative complications.

Dependent variable	Covariate	β	SE	95% CI	*p*-value
Minor complications	Sex	-0.10	0.21	-0.65 – 0.18	0.265
	Age	0.02	0.00	-0.01 – 0.01	0.854
	BMI	-0.05	0.01	-0.02 – 0.01	0.636
	Change in BMI	-0.06	0.01	-0.01 – 0.01	0.512
	Subcostal Scar	0.09	0.15	-0.17 – 0.44	0.383
	Comorbidities	0.25	0.12	-0.11 – 0.37	0.283
	DM	-0.04	0.25	-0.57 – 0.42	0.781
	HTN	0.20	0.18	-0.09 – 0.062	0.144
	Hypothyroid	-0.12	0.18	-0.5 – 0.021	0.422
	Dyslipidemia	0.08	0.26	-0.33 – 0.072	0.464
	Number of procedures	0.20	0.03	0.01 – 0.14	0.030*
	Liposuction	0.13	0.09	-0.07 – 0.31	0.206
Major complications	Sex	-0.04	0.12	-0.29 – 0.20	0.717
	Age	0.02	0.00	0.00 – 0.01	0.831
	BMI	0.17	0.00	0.00 – 0.02	0.146
	Change in BMI	0.03	0.00	-0.01 – 0.01	0.759
	Subcostal Scar	0.02	0.09	-0.17 – 0.19	0.885
	Comorbidities	0.00	0.07	-0.14 – 0.14	0.994
	DM	0.06	0.15	-0.24 – 0.35	0.708
	HTN	-0.11	0.11	-0.29 – 0.13	0.447
	Hypothyroid	0.23	0.11	-0.06 – 0.36	0.166
	Dyslipidemia	-0.06	0.16	-0.39 – 0.23	0.595
	Number of procedures	-0.14	0.02	-0.07 – 0.01	0.148
	Liposuction	-0.03	0.06	-0.13 – 0.10	0.806
Cumulative complications	Sex	-0.12	0.22	-0.72 – 0.16	0.208
	Age	0.03	0.00	-0.01 – 0.01	0.769
	BMI	0.04	0.01	-0.01 – 0.02	0.713
	Change in BMI	-0.04	0.01	-0.01 0.01	0.652
	Subcostal Scar	0.09	0.16	-0.17 – 0.47	0.363
	Comorbidities	0.24	0.13	-0.12 – 0.38	0.310
	DM	-0.01	0.27	-0.54 – 0.51	0.957
	HTN	0.13	0.19	-0.19 – 0.056	0.335
	Hypothyroid	0.00	0.19	-0.37 – 0.38	0.987
	Dyslipidemia	0.04	0.28	-0.44 – 0.67	0.691
	Number of procedures	0.12	0.04	-0.03 – 0.12	0.208
	Liposuction	0.11	0.10	-0.09 – 0.31	0.288

β, beta coefficient; SE, standard error; CI, confidence limits; BMI, body mass index; DM, diabetes mellitus; HTN, hypertension.
* Statistically significant

dehiscence, seroma formation, and infection have been shown to correlate with the greater number of concurrent procedures.

We found a correlation between the rate of minor skin necrosis and a greater change in BMI. The authors suspect that in these patients, the greater change in BMI may often necessitate a greater volume tissue removal, potentially predisposing patients to wound complications. In addition, patients with greater change in BMI may ultimately have a higher incidence of metabolic and hemostatic changes, additional risk factors for wound healing complications.

Conclusions

The FDL abdominoplasty is an effective procedure to correct abdominal contour deformities in both the vertical and transverse dimensions, while simultaneously addressing excess soft tissue in the epigastric region. Overall, complications are common following this procedure. Luckily, the majority are minor and resolve without the need for operative intervention.

Declaration of Competing Interest

None declared.

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Ethical approval

Not required.

References

1. Finucane MM, Stevens GA, Cowan MJ, et al. National, regional, and global trends in body-mass index since 1980: Systemic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants. *Lancet* 2011 Feb 12;**377**(9765):557–67.
2. Kitzinger HB, Abayev S, Pittermann A, et al. The prevalence of body contouring surgery after gastric bypass surgery. *Obes Surg* 2012;**22**(1):8–12.
3. Song AY, Rubin PJ, Veena T, et al. Body image and quality of life in post massive weight loss body contouring patients. *Obesity* 2006;**14**(9):1626–36.
4. Mitchell RT, Rubin JP. The fleur-de-lis abdominoplasty. *Clin Plast Surg* 2014;**41**(4):673–80.
5. Coon D, Michaels J 5, Gusenoff JA, Purnell C, Friedman T, Rubin JP. Multiple procedures and staging in the massive weight loss population. *Plast Reconstr Surg* 2010;**125**(2):691–8.

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Interpositional collagenated cancellous bone blocks for nasal dorsum augmentation: A new technique for nasomaxillary hypoplasia treatment

Dear Sir,

Nasomaxillary hypoplasia is a rare congenital malformation involving the middle third of the face. Depending on its severity, patients present the following clinical features to varying degrees: an arhinoid face, abnormal position of the nasal bones, maxillary hypoplasia with subsequent malocclusion, a reduced or absent anterior nasal spine (ANS), atrophy of the nasal mucosa, and absence of frontal sinuses[1]. Orthognathic surgery (OS) and rhinoplasty are suitable and powerful techniques for both the functional and aesthetic management of these patients[2].

The present paper describes a novel technique for restoring the nasal projection in a patient with nasomaxillary hypoplasia, analyses its advantages and limitations, and discusses its potential applicability in other similar contexts.

A 22-year-old woman was referred to our Department with malocclusion and self-esteem problems related to a severe concave facial profile. The rest of her medical history was unremarkable, with no antecedents of facial trauma.

The physical examination revealed midfacial hypoplasia with both nasal and maxillary related aesthetic and functional problems. In relation to the nasal alterations, the following clinical aspects were noted: absence of nasal projection with a flattened nasal tip and dorsum, a short columella, and acute nasolabial and obtuse frontonasal angles. In relation to the maxillary problems, the sagittal and transversal maxillary deficiency was associated with class III malocclusion, with significant underbite (anterior crossbite) - all resulting in a flat facial profile (Figure 1).

Cone-beam computed tomography (CBCT) revealed decreased anterior cranial base dimensions and a hypoplastic but existent ANS, thereby confirming the diagnostic suspicion of nasomaxillary hypoplasia. Consensus was reached in advising concomitant rhinoplasty and OS after orthodontic treatment. The Declaration of Helsinki guidelines were followed in all the treatment phases, and written informed consent was obtained.

The patient was operated upon under general anaesthesia. OS for occlusal and maxillo-mandibular discrepancy correction led to nasal tip projection, since the ANS and premaxilla supported it. Then, the nasal dorsum defect was resolved using the following novel technique. Subperiosteal dissection over the lateral aspects of the nasal bones and the medial aspects of the maxillary bones was achieved through the intraoral approach of LeFort I osteotomy. Then, lateral osteotomies of the nasal bones were performed integrally with a piezoelectric device using a long cutting saw tip (Implant Centre 2®, Satelec-Acteon Group, Tuttlingen), and digital in-fracturing was completed with light pressure (thus being able to avoid paramedian and superior osteotomies). A quadrangular cancellous block of xenogenic bone (OsteoBiol® Sp-Block. Tecnoss, Italy) ($10 \times 10 \times 20$ mm) was divided into two triangular prisms. Finally, the nasal pyramid was projected by interpositioning the two triangular prisms bone blocks (10 mm of height) on each side in the osteotomies between the nasal and the frontal processes of the maxillary bones (Figure 1, 2). The subperiosteal elevation of the paranasal area associated to the Le Fort I technique, which implied nasal septum detachment, allowed not only for direct intraoral visualization of the osteotomies but also for superior displacement of the osteotomized pyramid (with the aid of a periosteal elevator), and for sliding the grafts in the slot pushed up until enough symmetrical elevation had been achieved. Radix acted as a hinge area and its forward displacement was minimal. After wound suture, external splinting with

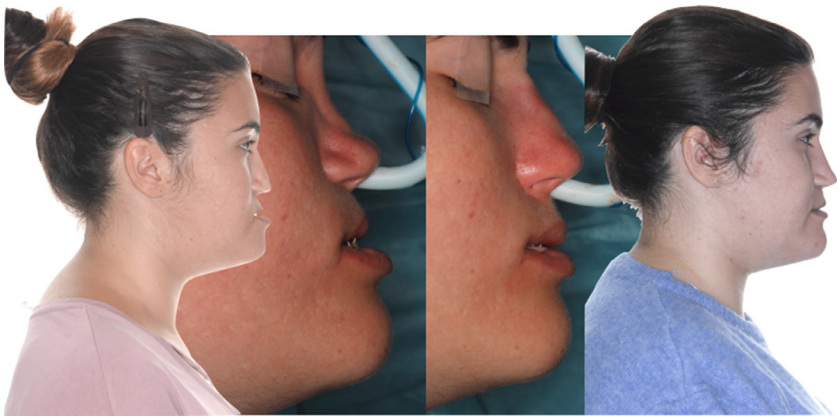

Figure 1 From left to right: female patient with nasomaxillary hypoplasia, facial profile immediately after orthognathic surgery, where nasal tip projection is evidenced, facial profile immediately after rhinoplasty, where straightening of the nasal dorsum is evidenced, and one-year follow-up facial profile.

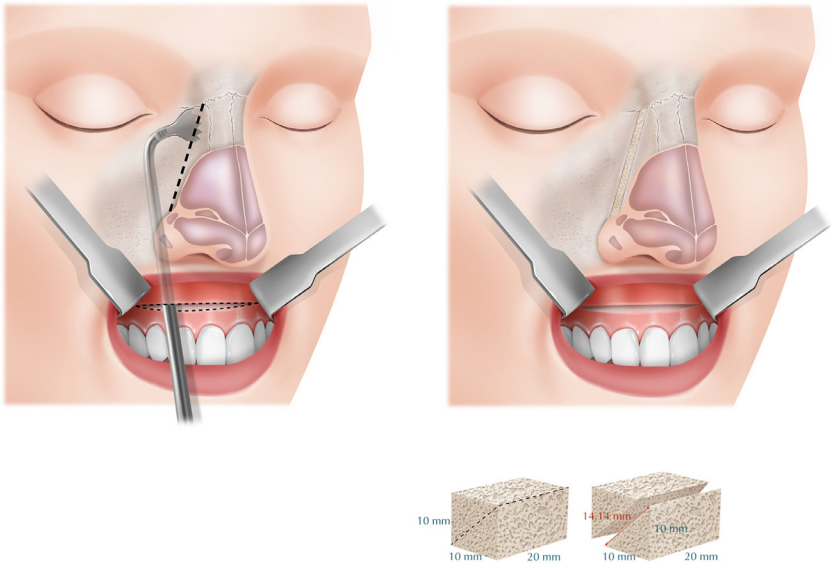

Figure 2 Illustration showing lateral osteotomies of the nasal bones using a piezoelectric device and projection of the nasal pyramid by interpositioning two triangular-shaped blocks of collagenated cancellous bone on each side.

adhesive strip and self-adhesive padded aluminium splint was carried out.

At 12 months of follow-up, no complications had been reported, the patient remained satisfied with the outcome, and surgical stability was evidenced through photographic assessment (Figure 1). The pre- and the two postoperative (at one and 12 months of follow-up) CBCT datasets were superimposed by means of surface matching with a specific software (Dolphin Imaging & Management Solutions, Chatsworth, CA, USA). It revealed a stable increased projection of the nasal dorsum and ANS of 5.18 mm and 5.52 mm, respectively (SupFig. 1).

To date, one-stage surgery in the form of rhinoplasty and OS is considered the best treatment option for nasomaxillary hypoplasia. As illustrated in the present case, maxillary repositioning involves partial or full nasal tip projection correction. Thus, according to Posnik, management of the nasal deformity should first establish a corrected maxillary foundation and only then proceed with construction of the nasal framework[2].

Several techniques and different kind of grafts have been proposed to reconstruct the nose. Although a one-piece L-shaped strut costochondral graft cantilevered to the frontal bone is the most widely accepted approach[2], no unequivocally superior surgical strategy and grafting procedure in terms of stability and nasal contour have been established so far. Different grafts have been used in nasal reconstruction, including autologous tissues (bone, cartilage, fascia, dermis) and alloplastic materials (Silastic, Gore-Tex, Mersilene). Alloplastic implants still pose an increased risk of prolonged infection and rejection, which can result in exacerbation of the deformity. The use of autologous materials is therefore preferred, due to the greater long-term stability afforded. Nonetheless, grafts definitively placed at early

ages are subject to great variability in resorption and overgrowth, with less predictable results[2].

On the other hand, collagenated cancellous bone graft blocks have been widely used in maxillofacial reconstruction, with satisfactory outcomes in terms of stability[3]. The technique described in this study, involving interpositional graft blocks, allows us to approach the base of the nasal dorsum while restoring its projection without altering the morphology of the nasal pyramid - avoiding shape irregularities, as well as donor site morbidity. However, the technique is not suitable for cases characterized by a total lack of nasal bones. Conversely, this technique could be extended to patients with Binder-type features.

In the context of OS, the intraoral approach to lateral nasal osteotomy is an excellent option for avoiding visible scars[4]. In addition, the use of piezoelectric instrumentation is more precise and less traumatic[5].

To sum up, the described technique affords satisfactory nasal dorsum augmentation while avoiding the use of permanent foreign materials, with minimal morbidity, no unsightly scars, great patient satisfaction, and adequate stability.

Ethical approval

The Declaration of Helsinki guidelines were followed in all the treatment phases, and written informed consent was obtained.

Financial disclosure and products

The authors have no financial interests to declare regarding the contents of this article.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2020.08.137.

References

1. Holmström H. Clinical and pathologic features of maxillonasal dysplasia (Binder's syndrome): significance of the prenasal fossa on etiology. *Plast Reconstr Surg* 1986;**78**(5):559–67.
2. Posnick JC. Surgical management of binder syndrome: lessons learned. *Aesthet Plast Surg* 2010;**34**(6):731–3.
3. VS K., PS C., LK P. Biograft block hydroxyapatite: a ray of hope in the reconstruction of maxillofacial defects: J Craniofac Surg; 2016. p. 247–52.
4. Ghassemi A, Riediger D, Hölzle F, Gerressen M. The intraoral approach to lateral osteotomy: the role of a diamond burr. *Aesthet Plast Surg* 2013;**37**(1):135–8.
5. Gerbault O, Daniel RK, Kosins AM. The role of piezoelectric instrumentation in rhinoplasty surgery. *Aesthet Surg J* 2016;**36**(1):21–34.

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Visual representation of racial diversity in aesthetic surgery literature

Dear Sir,

Aesthetic surgery relies on the complex relationship between science and art to transform the human body and achieve a more appealing form. Additionally, plastic surgery is a highly visual field that relies on visual data in the diagnosis, planning, treatment, evaluation, and follow up of patient surgical outcomes. While there has been increasing focus on equity in medicine, the effect of this on racial representation in the aesthetic plastic surgery literature is unclear.

A photogrammetric analysis was performed on all images published in the Aesthetic Surgery Journal (ASJ) in 1996, 2000, 2010, and 2016. Images depicting human figures were categorized as white or non-white based on skin tone using the Fitzpatrick scale as a guide with input from observable phenotypes following previously published methods.[1,2] The average number of white and non-white images per article were compared using the Student's *t*-test. The average number of white and non-white images over time was evaluated by univariate regression analysis; multivariate analysis was performed to control for the effect of time and international articles on the publication of non-white images.

A total of 2042 images were analysed (Table 1). 1608 (78.7%) images represented white subjects while 434 (21.2%) were of non-white subjects. The percentage of non-white images increased from 5.4% in 1996 to 25.8% in 2010; this number remained stable between 2010 and 2016 (25.1%). Pearson's correlation coefficient for average number of images per article over time revealed values of $r = 0.10 \pm 0.05$ for white images and $r = 0.15 \pm 0.05$ for non-white images, suggesting a slightly higher rate of increase in the publication of non-white images overtime.

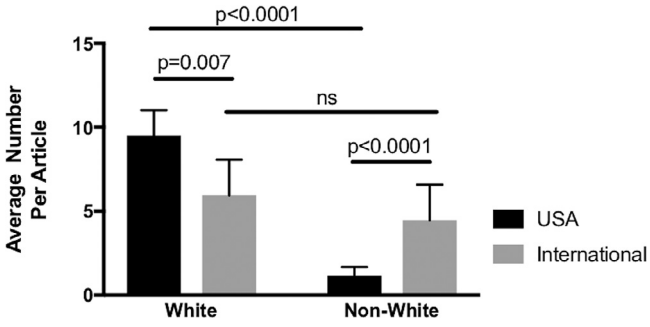

Fig. 1 Average images per article representing white and non-white subjects in the Aesthetic Surgery Journal over time.

10.8% of images from American authors were of non-white subjects in contrast to 42.5% from international authors (Table 1). No non-white images were seen in the earlier years evaluated. While there has been an increase in the number of white images in international articles to 187, there has been an even greater increase in non-white representation from 0 to 146 (46.6%) images during the study period. This is in contrast to the much smaller increase in non-white representation found in American publications to 67 (13.8%) compared to 418 (86.25%) white images in 2016. Most notably, there was a statistically significant difference between the number of white and non-white images in papers from the United States ($p < 0.001$) while there was no difference in international papers (Figure 1).

The results of the Pearson coefficient analysis are far more striking when stratified by the origin of the paper. For the average number of images per article over time for American papers, $r = 0.25 \pm 0.06$ for white images and $r = 0.07 \pm 0.007$ for non-white images (Supplemental Figure 1). For international papers $r = -0.28 \pm 0.10$ for white images and $r = 0.27 \pm 0.10$ for non-white images (Supplemental Figure 1). These data confirm that there has been a statistically significant shift from more white images to non-white images in international papers while American papers

Presentated at: This work has been presented at the *2018 University of Washington Department of Surgery Schilling Research Symposium* in Seattle, WA. Part of this data was included in a presentation at *Plastic Surgery: The Meeting 2017* in Orlando, FL.

Table 1 Analysis of the visual representation of race in the *Aesthetic Surgery Journal* over time.

	Articles			Images			Graphics		
	Figures (%)	Non-White images (%)	Non-White Graphics (%)	White (%)	Non-White (%)	Unidentifiable	White (%)	Non-White (%)	Unidentifiable
Total	193 (43.3)	53 (27.5)	4 (2.1)	1608 (78.7)	434 (21.2)	39	277 (98.2)	5 (1.8)	65
1996	20 (48.9)	2 (10.0)	0 (0)	141 (94.6)	8 (5.4)	0	5 (100)	0 (0)	24
2000	38 (42.7)	4 (10.5)	0 (0)	271 (93.8)	18 (6.2)	0	50 (100)	0 (0)	17
2010	64 (58.2)	23 (35.9)	0 (0)	593 (74.2)	206 (25.8)	7	110 (100)	0 (0)	3
2016	71 (39.0)	24 (33.8)	4 (5.6)	603 (74.9)	202 (25.1)	32	112 (95.7)	5 (4.3)	21
United States	130 (39.8)	25 (19.4)	1 (0.8)	1228 (89.2)	148 (10.8)	22	188 (99.5)	1 (0.5)	48
1996	19 (21.3)	2 (10.5)	0 (0)	129 (94.2)	8 (5.8)	0	5 (100)	0 (0)	24
2000	36 (40.9)	4 (11.1)	0 (0)	255 (93.4)	18 (6.6)	0	50 (100)	0 (0)	6
2010	36 (49.3)	9 (25.0)	0 (0)	427 (88.6)	55 (11.4)	6	79 (100)	0 (0)	2
2016	39 (36.4)	10 (25.6)	1 (1.8)	418 (86.2)	67 (13.8)	16	54 (98.2)	1 (1.8)	16
International	63 (52.9)	27 (42.8)	3 (4.8)	380 (57.5)	281 (42.5)	17	89 (95.7)	4 (4.3)	17
1996	1 (33.3)	0 (0)	0 (0)	12 (100)	0 (0)	0	0 (0)	0 (0)	0
2000	2 (100)	0 (0)	0 (0)	16 (100)	0 (0)	0	0 (0)	0 (0)	11
2010	27 (71.1)	13 (48.1)	0 (0)	167 (53.4)	146 (46.6)	1	31 (100)	0 (0)	1
2016	33 (43.4)	14 (42.4)	3 (9.1)	187 (57.8)	135 (42.2)	16	58 (93.5)	4 (6.5)	5

show an increased publication of white images during this same time period.

This is the first study to examine racial diversity in the aesthetic surgery literature, which serves as a guide for trainees and clinicians in the field. The results suggest that the visual representation of racial diversity approximates the racial distribution of the United States[3] as well as the population undergoing cosmetic surgery per the American Society of Aesthetic Plastic Surgery Statistics Report[4] and the American Society of Plastic Surgeons.[4,5]

This apparent equity in visual representation is the result of international contributions rather than diversification of the images published by American authors. Unfortunately, these results show that there is a statistically significant underrepresentation of published images depicting non-white subjects from American research groups. This may be the result of a lack of studies that include images of non-white skin or papers submitted with non-white images that are not selected for publication.

While it is difficult to determine the factors that contributed to the absence of non-white images in the earlier years analysed, the small number of publications could be a contributing factor in addition to perceived pressure on foreign authors to include fair skinned individuals given the precedent set in previous editions of the journal and medical literature in general. However, it seems that foreign authors are now more confident in including images of subjects that exemplify the patients they are treating in their practices, which has significantly increased the diversity of representation in the ASJ.

The goal of this study was to highlight the presence of disparities in the aesthetic surgery literature. Plastic surgery researchers in the United States need to be more racially inclusive in the images presented in publications. Authors are encouraged to critically evaluate their images to ensure that documented photography in the aesthetic surgery literature promotes more equitable care of patients.

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Ethical approval

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Declaration of Competing Interest

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Supplementary materials

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References

1. Massie JP, et al. Patient representation in medical literature. *Plast Reconstr Surg - Global Open* 2019;**1**. doi:10.1097/gox.0000000000002563.
2. Louie P, Wilkes R. Representations of race and skin tone in medical textbook imagery. *Soc Sci Med* 2018. doi:10.1016/j.socscimed.2018.02.023.
3. United States Census Bureau *ACS demographic and housing estimates (2009-2013 American community survey 5-year estimates)*; 2013.
4. American Society of Aesthetic Plastic Surgery *Cosmetic surgery national data bank statistics*; 2017.
5. American Society of Plastic Surgeons. ASPS 2018 plastic surgery statistics report. (2018).

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Adapting Donabedian's structure-process-outcome triad for quality improvement activities in surgical cleft-craniofacial care

Dear Sir,

The delivery of high-quality surgical care, inclusive of cleft-craniofacial care, is a universal goal of the health care system. However, such high-quality care is not always achieved, and there exists a wide variety of the quality of care among countries, regions, hospitals, and surgeons. This raises the necessity for quality improvement initiatives, that is, data-guided, deliberate activities designed to correct workflow procedures, reduce variations in care, and address administrative, educational, or clinical problems. Quality improvement activities are vital at all levels of the health care system, from the managerial macro-allocative decision making (governmental and organizational level) to surgeon-patient encounters (point-of-care provider level).[1]

We argue that surgeon-led quality improvement activities valuing the needs of the patients could transform the delivery of high-quality surgical cleft-craniofacial care. For this, the Donabedian structure-process-outcome triad, a widely used quality model in health care,[2] is adapted (Figure 1) to truly incorporate the patient's voice when appraising whether a quality improvement effort leads to change in the selected endpoint and requires additional actions to bring structure or process features into acceptable ranges.

Surgeons are an important part of the quality equation. By performing continuous quality improvement activities, surgeons could reflect on their surgical performance (process), leveraging a "golden opportunity" to implement changes that will enhance outcomes. For any meaningful appraisal of a surgeon's quality improvements, the proper selection of measurement metrics is critical. Performance metrics have traditionally focused on structures (e.g., hospital or surgeon volume), process (e.g., adherence to treatment protocols and guidelines), and outcomes (e.g., length of stay, symptoms, complications, and revision surgery rates).[2,3] These metrics continue to be important,

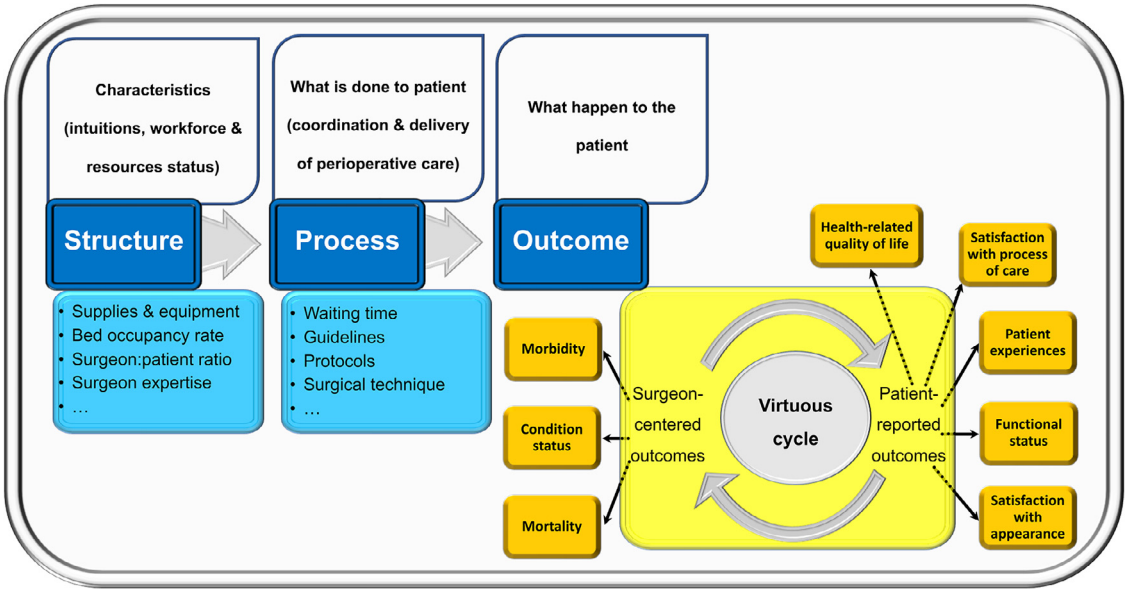

Figure 1 Adapted Donabedian structure-process-outcome triad for measuring quality improvement activities in surgical cleft-craniofacial care. To measure ongoing or newly implemented services or care and catch problems representing opportunities for improvement, each surgeon should examine the multifaceted elements of the Donabedian model: structure by evaluating physical configuration, facility, and provider qualifications; process by assessing any procedure such as timing (e.g., waiting time for procedure or backlog), diagnostic test (e.g., access to nasoendoscopy diagnostic of velopharyngeal insufficiency), or surgical intervention across the perioperative period; and outcome by considering both patient-reported outcome measures (patient-perceived status of function, appearance, and quality of life, etc.) and metrics of morbimortality and disease status (e.g., evaluation of dental arch relationships, speech quality, facial movement, facial or labial symmetry, length of stay, readmission, complication, and mortality rates). The voice of the patient must be incorporated into the scope and process of quality improvement to achieve a cycle (gray arrows) of surgical cleft-craniofacial care that includes patient-reported outcome measure-derived data as a driving force for improvement of surgeon-centered outcome measures (and vice-versa).

but they are no longer sufficient as they do not fully consider or prioritize the outcomes that are most valued by patients. Quality improvement activities will thus require surgeons to systematically analyze patient-reported outcome measures (PROMs). PROMs are powerful tools that meticulously convert patients' views of their health conditions and their treatments into numerical scores.[4]

The recently validated and reliable condition-specific PROMs (i.e., CLEFT-Q, FACE-Q, and VELO instruments) [4,5] offer a unique opportunity to improve quality in surgical cleft-craniofacial care by improving shared decision-making procedures, optimizing perioperative workflow, monitoring treatment progress, and individualizing treatment. Importantly, the consideration of these PROMs as an integral part of surgical practice and quality improvement measurements does not invalidate the traditional outcome measures; a PROM tool can provide valuable information that complements traditional outcome measures (and vice versa).[5] The set of traditional outcome measures and PROM tools can be tailored to each situation.

Achievement of high-quality care provision is not an easy task, but it should be the goal of surgeons. As surgeons, we should embark on this patient-centered quality improvement journey. This journey will be long and full of challenges and obstacles, but its potential positive impact on patient care outcomes is worth of all the surgeon-coordinated efforts to deliver high-quality surgical cleft-craniofacial care across the globe.

Declaration of Competing Interest

There are no conflicts of interest to disclose.

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References

1. Zhang JX, Song D, Bedford J, Bucevska M, Courtemanche DJ, Arneja JS. What is the best way to measure surgical quality? comparing the American College of Surgeons National Surgical Quality Improvement Program versus traditional morbidity and mortality conferences. *Plast Reconstr Surg* 2016;**137**:1242–50.
2. Ayanian JZ, Markel H. Donabedian's lasting framework for health care quality. *N Engl J Med* 2016;**375**:205–7.
3. Lee A, Chang BL, Yan C, et al. The reducing opioid use in children with clefts protocol: a multidisciplinary quality improvement effort to reduce perioperative opioid use in patients undergoing cleft surgery. *Plast Reconstr Surg* 2020;**145**:507–16.
4. Harrison CJ, Rae C, Tsangaris E, et al. Further construct validation of the CLEFT-Q: Ability to detect differences in outcome for four cleft-specific surgeries. *J Plast Reconstr Aesthet Surg* 2019;**72**:2049–55.
5. Denadai R, Lo LJ. Building a virtuous cycle of surgical cleft-craniofacial care by combining surgeon centered outcome and patient reported outcome measures. *J Plast Reconstr Aesthet Surg* 2020. doi:10.1016/j.bjps.2020.02.023.

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Cosmetic tourism amidst the Covid-19 global pandemic

Dear Sir,

Amidst the current global pandemic, when healthcare resources worldwide have been restructured to save the lives of the critically ill and all non-essential surgery has ceased, we want to highlight a case of cosmetic tourism complications putting an increased burden on these already overstretched resources.

We previously published a case series of patients returning to Northern Ireland requiring treatment of complications following cosmetic procedures abroad, including prolonged aftercare and average costs to the NHS of over £4000 per person.[1] We were surprised to discover that cosmetic tourism is still ongoing despite the global restrictions on travel and the statement from the European Association of Societies of Aesthetic Plastic Surgery (EASAPS) to immediately stop cosmetic tourism after the World Health Organisation declared a global pandemic on the 11th March 2020. In a statement also that also highlighted the concerns of post-operative care and follow-up and the risk of complications subsequently putting added pressure on health care systems.[2]

The patient in question is a 43-year-old female who travelled from the United Kingdom (UK) to Poland for a circumferential abdominoplasty with 'fleur-de-lis' extension at the start of June 2020. On returning home, she required admission to an NHS hospital 3 weeks post-operatively due to wound necrosis, dehiscence and cellulitis. This necessitated an inpatient stay for intravenous antibiotics, surgical debridement, washout of haematoma and application of negative pressure wound therapy (NPWT), with ongoing outpatient management to date. She had a past medical history of depression and previous gastric band surgery 2 years previously, with a pre-operative BMI of 24.

A recent paper by Kaye et al. has led to proposed guidelines from the leading aesthetic associations around the world, including the British Association of Aesthetic Plastic Surgeons (BAAPS), International Society of Aesthetic Plastic Surgeons (ISAPS) and the American Society of Aesthetic Plastic Surgeons (ASAPS), on how to safely reintroduce aesthetic surgery in the wake of the Covid-19 pandemic. Specifically,

This letter has not been presented anywhere else.

in relation to these recommended guidelines, the patient was asked what advice she was given with regards to Covid-19 risk. Interestingly, she was required to have a negative Covid-19 antigen swab, however this was performed 1 week pre-operatively and in the interim period she was not required to self isolate or get re-tested, nor was she advised to self isolate or take precautions while travelling from the UK to Poland. In addition, she was not consented regarding the associated risks of contracting Covid-19 in the perioperative period.[2]

At the time this procedure took place, Poland was trending towards their peak number of active cases with the highest daily number of new cases in Poland since this global pandemic began ($n = 599$) recorded the day before our patients' surgery.[3]

Cosmetic tourism is already known to put patients at higher risk of multiple complications which is discussed in more detail in our previous article. However, the additional concerns surrounding this case are numerous, including; air travel for non-essential purposes, the lack of self isolation pre-operatively and a covid-19 test far in advance of surgery with disregard for any viral incubation period, particularly with this patient's travel related risk. There was complete disregard for EASAPS guidance banning aesthetic surgery in this global pandemic, exacerbated by the fact this particular week was the peak of Covid-19 cases in Poland.

It must be highlighted that guidance is in place to assist surgeons in these decision making processes. An article endorsed by the Royal College of Surgeons of England aims to minimise Covid-19 risk to both patients and staff during elective surgery. Guidance involves self-isolation for 14 days and a negative antigen test 1–3 days prior to surgery.[4] Guidelines for aesthetic surgery in particular have also been released, focusing on how to safely restart aesthetic surgery in the wake of this global pandemic. Recommendations include; operating on low risk patients, ASA 1 or 2 and procedures lasting less than 3 h. Patients should be screened for Covid-19 symptoms and have a negative Covid-19 test pre-operatively. The addition of a specific Covid-19 consent form will ensure informed consent in the new era of living with Covid-19.[2] The risks to patients undergoing surgery who develop a perioperative Covid-19 infection are significant and have been highlighted in a recent publication in the Lancet, including; a 51% risk of post-operative pulmonary complications and a 30-day mortality rate of 38%.[5]

As we recover from this global pandemic and the world begins to normalise, we urge all surgeons undertaking aesthetic procedures to ensure they follow the relative aesthetic association guidelines to ensure both patient and staff safety. Our healthcare systems are currently at breaking point and the future remains unknown, for the greater good of mankind, we as surgeons must ensure our decisions are well informed and evidence based as we will be held accountable for our actions.

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Declaration of Competing Interest

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References

1. Martin S, Long R, Hill C, Sinclair S. Cosmetic tourism in Northern Ireland. *Ann Plast Surg* 2019;**83**(6):618–21.
2. Kaye K, Paprottka F, Escudero R, et al. Elective, non-urgent procedures and aesthetic surgery in the wake of SARS-COVID-19: considerations regarding safety, feasibility and impact on clinical management. *Aesth Plast Surg* 2020;**44**:1014–42.
3. World Health Organisation health emergency dashboard; WHO COVID-19 Homepage- Poland. Available at: https://covid19.who.int/region/euro/country/pl [accessed 03 July 2020].
4. Cook, T., Ferguson, K., Johannsson, H., Harrop-Griffiths, G. (2020). Managing theatre processes for planned surgery between COVID-19 surges. [online]. Intensive care medicine anaesthesia covid-19. Available at: https://icmanaesthesiacovid-19.org/managing-theatre-processes-for-planned-surgery-between-covid-19-surges [accessed 01 July. 2020].
5. Nepogodiev Dmitri, Glasbey James C, Li Elizabeth, et al. COVIDSurg Collaborative, Mortality and pulmonary complications in patients undergoing surgery with perioperative SARS-CoV-2 infection: an international cohort study. [published online ahead of print, 2020 May 29] [published correction appears in Lancet. 2020 Jun 9;:]. *Lancet* 2020;**S0140-6736**(20) 31182-X. doi:10.1016/S0140-6736(20)31182-X.

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Looking ahead to a trauma service with COVID-19

Dear Sir,

We read with interest about the implementation of a one-stop hand trauma clinic at the Royal Free Hospital[1] and the correspondence from Leeds Teaching Hospitals regarding patterns of hand trauma during the COVID-19 lockdown.[2] Over recent years North Bristol Trust (NBT) Plastic Surgery department has moved away from the one-stop clinic model as we have evolved our hand trauma service. However, during the COVID-19 pandemic we note that single contact care is the gold standard in order to avoid repeated trips to hospi-

Table 1 Changes to the plastic surgery department during COVID-19 pandemic.

Referral changes	Practice changes	Follow-up changes
New traffic light referral system for hand and burn injuries for local & regional referrals	Mini C-arm use in one-stop clinic	Preference for telephone review to replace face-to-face
Direct route into Trauma Clinic from ED triage	"Amber" and "Green" zones	Video conferencing for Hand Therapy with Physiotherapy & Occupational Therapy
One-stop Trauma Clinic	Absorbable suture material as standard	Implementation of traffic light system for follow up
Extension of Trauma Clinic open hours (8am-8pm)	Regional or local anaesthetic preference	Patient Information Leaflets for common injuries and post-operative care
Telemedicine referrals for regional burns injuries	Open access to trauma day case theatre (8am-5pm)	Patient managed dressings wherever possible with telephone or teleconferencing support

tal and to minimise the risk to both patients and staff members of contracting COVID-19.[3]

Furthermore, the joint memorandum from the Royal College of Surgeons and the Royal College of Emergency Medicine (RCEM) to the House of Commons select committee, makes it clear that we cannot expect to return to our old systems and infrastructure. As suggested by the RCEM President, Dr K Henderson, we must rapidly expand our same day emergency care models to relieve pressure on our Emergency Departments, who are working with a reduction in capacity due to infection control measures and social distancing.[4]

Similar to that described by the Royal Free we set up a one-stop Plastics Trauma Clinic in anticipation of high volumes of hand trauma and a concurrent increase in demand related to directly seeing all minor trauma from the Emergency Department (ED). Within our one-stop Plastics Trauma Clinic setting we built in the ability to assess patients on the day of referral, image injuries using a Mini C-arm fluoroscope, and ensured open access to a day case theatre. A summary of all the changes made to our service is seen in Table 1. However, our experience has been similar to that reported by Garude et al.[2] in that we actually saw a significant reduction in hand trauma during the lockdown period.

Following the easing of restrictions and the return to a 'new normal' we are continually having to adapt our trauma service. This is influenced by the needs of the regional population as well as those of the hospital, whilst respecting new Infection Control guidelines including social distancing. Particular challenges include theatre availability as the elective surgery programme restarts, bed capacity within amber 'COVID-unknown' pathways, physical space for seeing increasing numbers of patients, and personnel issues where doctors and specialist nurses may be required to self-isolate for prolonged periods at short notice. As lockdown lifts, and particularly with the return to work of manual labourers, we are once again seeing an increase in injuries presenting to the unit despite no longer taking all minor injuries from ED. We anticipate a further spike in injuries with the opening of pubs, bars and restaurants in the near future.

As a Plastic Surgery department we can expect to see an increase in referral volume if the proposed diversion of minor injuries from ED is adopted. This potential increased service provision will require upskilling of existing nursing staff and the employment of Emergency Nurse Practitioners in order to safely and effectively provide point of contact, same day emergency plastic surgery care.

Going forward we believe the one-stop model is essential in achieving the desired same day emergency care model, but it is the ability of the service to expand and contract to demand which is essential. We have discussed some of the measures implemented by our Plastic Surgery department and these will continue forwards as we find new ways of working alongside the presence of COVID-19 and the threat of a second wave. We advocate for increased flexibility within departments with a preference for single-stop service for trauma patients.

Ethical approval

N/A.

Declaration of Competing Interest

None.

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References

1. Sadr Mr A H, et al. Managing hand trauma during the COVID-19 pandemic using a one-stop clinic. *J Plast Reconstruct Aesthet Surg* 2020;**73**(7):1357–404.
2. Garude K. et al. Patterns of adult and paediatric hand trauma during the COVID-19 lockdown. *J Plast Reconstruct Aesthet Surg* 2020;**73**(8):1575–92.
3. Public Health England. COVID-19: infection prevention and control (IPC). https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control. Accessed 02/07/2020.

4. Alderson D., Henderson K. Helping the NHS recover from COVID-19: A joint memorandum from the Royal College of Surgeons of England and the Royal College of Emergency Medicine. 2020.

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Letter to the editor comments on JPRAS publication "Autologous abdominal wall reconstruction using anterolateral thigh and iliotibial tract flap after extensive tumor resection: A case series study of 50 consecutive cases"

Dear Sir,

We congratulate Dr. Kagaya et al on their retrospective case series study of abdominal wall defects in Zones 1–3 restored with pedicled or free anterolateral thigh and iliotibial tract fascial flaps.[1]

The authors use ALT/TFL flaps without muscle. Dr. Kagaya writes that "RAM defects were not a factor that caused abdominal bulge in the present study". They add a case (Figure 3) report to illustrate the hypothesis of the paper.

In a case series of 15 patients with grade 4 transmural abdominal wall defects in zones 1–3, we reported on the use of a PIVA flap (pedicled innervated vastus lateralis and ALT flap) to reconstruct large infected abdominal wall defects.[2] This patient population underwent a mean of 5 previous laparotomies, had had multiple previous infection related debridements, and all had significant comorbidities. Previous component release had been attempted to close the defects in all 15 patients, but failed. Besides the ALT and fascia, we introduced a highly vascularized muscle segment to better treat the infection and in order to introduce a dynamic component that could improve the functional outcome in these patients when biking or walking.

So why the differences in strategy, outcome and interpretation of both papers?

1. The case report (Figure 3) shows a fasciocutaneous defect in the central lower abdominal wall. The surrounding skin is fair and thin (BMI 16.7) and shows no signs of 'chronic surgical site infection'. The muscular wall appears intact on the picture: presumably the muscular wall could be closed with component release.
   In this situation a singular ALT flap is the perfect choice, even without TFL, since the muscular component is intact. As an alternative a synthetic mesh could be used underneath the ALT since there is no surgical site infection. No bulging nor herniation occurred postop due to all these fair features.
   This case report is not representative to the majority of cases that we are confronted with and may not be representative to the complex cases the authors were confronted with in this study.
2. The authors mention that the degree of obesity tends to be low in Japan, whereas they define in the results of the multivariate logistic regression analysis, that high body mass index was associated with abdominal bulge while abdominal defect size was not.
   Table 1 shows that only 9/50 (18%) of the patients had a BMI $>$ 25, 3/50 had a BMI $>$ 28 and only 1/50 had a BMI $>$ 30. This patient population is indeed meager with low BMI.
   Therefore, this population may not be the ideal group to prove the hypothesis that ALT/ITT (TFL) flaps may suffice for large transmural defects in order to avoid bulge or herniation.
   In a patient population with much higher mean BMI, the rates of bulging and herniation may have been significantly different exactly according to the findings of the authors.
3. The authors note that almost all of the articles on autologous abdominal wall reconstruction with flaps were case series with short-term results without sufficient investigation of bulging and herniation. The authors used CT or MRI to evaluate the outcome and extracted the clinical findings of bulge or hernia from the medical charts retrospectively. They note correctly that the latter data could not be used for evaluation since the follow-up 'often occurred unstructured on an individual base'.
   However, CT and MRI of a patient in dorsal position do not allow efficient grading of bulging or herniation. In order to objectively measure the impact of the reconstruction, dynamometric analysis of the abdominal may have been of use if preoperative data would have been available.
4. The authors classified surgical contamination in their cases: "clean/ clean-contaminated/contaminated/ dirty". In Table 1 these classes are given the score 0 (clean) or 1 (clean-contaminated). The authors wrote in the legend of Table 1 that "there were no contaminated or dirty operations in the present cases".
   It is imperative that before abdominal wall closure, serial debridement's have been performed to reduce the bacterial load and to diminish the surgical site infection rate. We can understand the lack of contaminated cases in this study from this perspective.

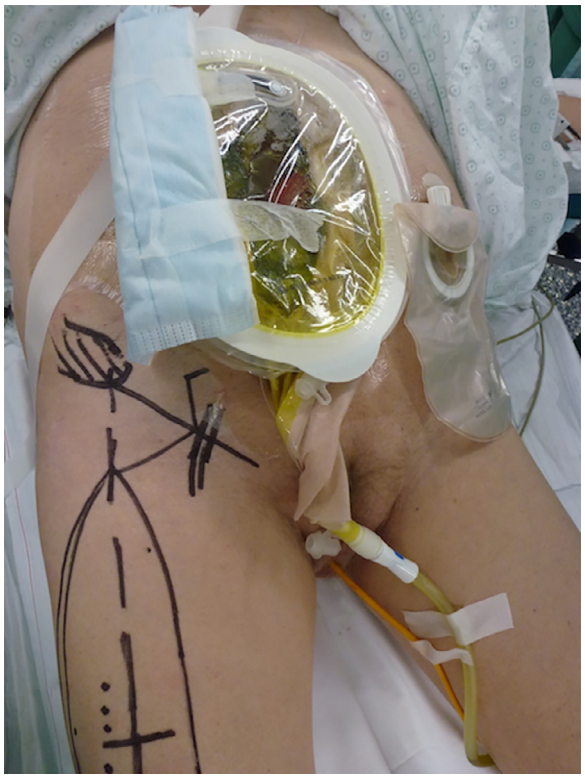

Figure 1a Grade 4 transmural abdominal wall defect. Presence of colostomy and urostomy.

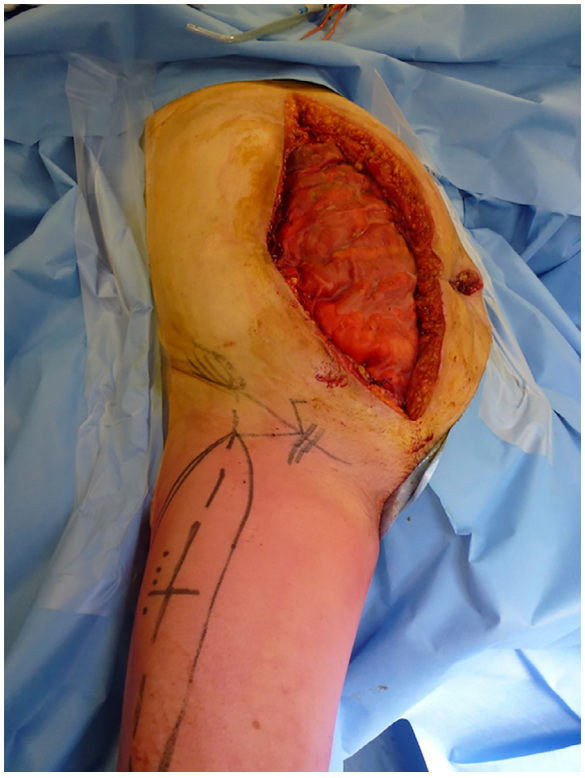

Figure 1b Vicryl mesh covers the bowels.

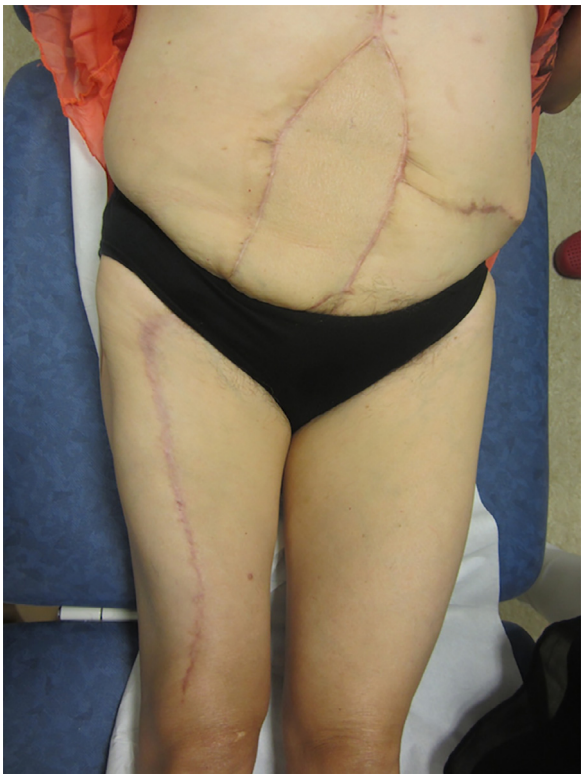

Figure 1c Healing after closure with a pedicled innervated vastus lateralis and anterolateral thigh flap.[2]

However, in the majority of cases presented to our team, the defects were situated close to a colostomy and/or urostomy, and had undergone several prior debridements in order to remove non-vascularised tissues and debris from the wound margin. The majority had had previous interventions for fistula's and skin erosions, for bowel adhesions and bowel obstructions and were labeled 'contaminated'; the 'clean' cases would be closed with component release or a synthetic mesh, and the 'clean-contaminated' with a biological mesh- if required- and covered with a pedicled ALT flap.

The patient population (and subsequently the defects) presented in this paper appears to be quite different from the patient population we are confronted with (Figures 1a-1c).

References

1. Kagaya Y, Arikawa M, Higashino T, Miyamoto S. Autologous abdominal wall reconstruction using anterolateral thigh and iliotibial tract flap after extensive tumor resection: a case series study of 50 consecutive cases. *J Plast Reconstr Aesthet Surg* 2020;**73**:638–50.
2. Vranckx JJ, Stoel AM, Segers K, Nanhekhan L. Dynamic reconstruction of complex abdominal wall defects with the pedicled innervated vastus lateralis and anterolateral thigh PIVA flap. *J Plast Reconstr Aesthet Surg* 2015;**68**(6):837–45.

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Letter of response to comments on publication: "Autologous abdominal wall reconstruction using anterolateral thigh and iliotibial tract flap after extensive tumor resection: A case series study of 50 consecutive cases"

Dear Sir,

We thank Dr. Vranckx for giving us the opportunity to discuss the potential problems regarding our proposed methods and results. Our responses to the issues that they mentioned are as shown below.

As mentioned in the manuscript[1], we had considered that rectus abdominis muscle (RAM) defects might cause a postoperative abdominal bulge or hernia before analyzing the data; however, RAM defects were not found to be factors that cause abdominal bulge according to our present statistical analysis. Postoperative bulging also occurred in cases of only oblique muscle defect, such as in patients with a high body mass index (BMI) or old age. Indeed, as shown in Fig. 3 of the present study[1], there were actually cases with no bulge despite having both a RAM defect and low BMI (Fig. 3, The muscular wall was completely resected in this case; only the transversalis fascia can be seen in this figure.) Of course, including different study populations might bring about different results, such as in the cases with highly contaminated wounds mentioned by Dr. Vranckx.

The population in our case series included patients after extensive tumor resection. As mentioned in the manuscript[1], these patients had a lot of postoperative risks, such as additional resection due to recurrence, radiotherapy, and susceptibility to infection by chemotherapy, so early postoperative wound healing without any infection was a priority. After comprehensive preoperative discussions between tumor surgeons and reconstructive surgeons, in which all of the possible risks and benefits were considered and the patients' intentions were discussed, autologous reconstruction using ALT + ITT was finally selected in each case. For patients with different backgrounds and in whom different priorities have been highlighted, such as no incidence of hernia or bulging, other methods of abdominal reconstruction should be considered.

The present study has a potential bias in the study population as indicated in this letter. As mentioned in the manuscript[1], the degree of obesity tends to be low in Japan; the rates of abdominal bulge and hernia might therefore be higher in other countries where the population has a higher BMI. However, it was noteworthy that the multivariate logistic regression analysis showed that a high BMI, not RAM defect, was an independent risk factor of postoperative bulging with the method of ALT+ITT, even in the relatively low BMI population. Also noteworthy was the lack of any incidence of hernia, in contrast to the high incidence of bulging, and practically no problematic clinical symptoms regarding bulging.

As mentioned in the manuscript[1], there does not appear to be a consensus on the definitions of bulge and hernia. Regarding bulge in particular, there is no diagnostic definition at all. We attempted to evaluate bulge and hernia as objectively as possible according to the results of imaging tests using the available information. As a result, the assessment by computed tomography (CT) in the supine position was considered the best option in the present study. It was noteworthy that all of the patients who had clinical bulge in the standing position had signs of bulge on imaging tests in the supine position. In contrast, there were no cases with no signs on imaging but clinical bulge on standing (i.e. no false negatives on CT). Furthermore, there were a substantial number of subclinical bulge cases (positive on CT but negative clinically). Hardly any evaluation of abdominal bulge or hernia after autologous abdominal wall reconstruction has been performed. Our determination of the actual long-term complication rate of bulge in the present study was thus considered to be one small step of progress regarding autologous abdominal wall reconstruction.

We understand that abdominal wall reconstruction can be more difficult to perform when the surgical area is contaminated as described by Dr. Vranckx in the present letter, and innervated muscle transplantation in addition to the fascia is considered to be a useful option for abdominal wall reconstruction in such cases. Innervated muscle transplantation can bring about better results than fascia reconstruction alone in terms of the abdominal function; however, we have several concerns about applying this method. First, with respect to musculo-skeletal oncology, the area adjacent to the additional incision is regarded as an area 'contaminated by tumor'. When performing additional resection due to tumor recurrence, the entire contaminated area must be resected with an appropriate margin. While this is not an issue if the recipient nerve for suturing can easily be detected from the resected area, surgeons may hesitate to make an additional incision to identify the recipient nerve in cases of tumor resection. Second, we are uncertain about the actual functionality of the transplanted innervated muscle, as muscles prominently atrophy due to denervation within several months[2], and recovery of innervation usually takes several months at least and never quite recovers to the preoperative level. A transplanted innervated muscle is of course better than a sole fascia or denervated muscle, but the practical function is unclear at

present. The harvesting of some muscles, such as the vastus latelaris, can carry a non-negligible risk of complications that should be weighed against the benefits concerning the abdominal function of transplanted innervated muscles. In some cases, a low rate of postoperative complications is prioritized, such as in patients with a severe tumor stage with a poor general condition or poor prognosis.

As a whole, the present study population was not typical (patients after extensive tumor resection, patients with a relatively low BMI); however, we feel that our presentation of the actual outcomes of rare cases of autologous abdominal wall reconstruction using ALT/ITT in the largest case series ever was significant. We hope that the results of the present study will be used as reference data to further improve and develop new methods of autologous abdominal wall reconstruction.

Declaration of Competing Interest

None declared.

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Reference

1. Kagaya Y, Arikawa M, Higashino T, Miyamoto S. Autologous abdominal wall reconstruction using anterolateral thigh and iliotibial tract flap after extensive tumor resection: A case series study of 50 consecutive cases. *J Plast Reconstr Aesthet Surg* 2020;**73**(4):638–50.
2. Sakakibara A, Kusumoto J, Sakakibara S, et al. Long-term effects on volume change in musculocutaneous flaps after head and neck reconstruction. *J Reconstr Microsurg* 2019;**35**(4):235–43.

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Anatomical location of the primary tumour and its relationship to regional lymph node metastasis in cutaneous head and neck melanoma: Is selective neck dissection appropriate?

Dear Sir,

We read with interest the article by Dale et al. and it provides a valuable addition to the literature.[1] The evidence regarding optimal neck dissection for regional control of head and neck cutaneous malignant melanoma is limited, and precise management of the neck has frequently been omitted from the major sentinel lymph node biopsy (SLNB) trials, even when queried for subsequent study design by us.

In 1995, the Sydney Melanoma Unit went counter to established practice and reported high rates of regional control with elective selective neck dissection in melanoma, as opposed to conventional comprehensive (I-V) lymphadenectomy.[2] By limiting the extent of neck dissection, procedural morbidity may be reduced. Practice shifted from elective neck dissection to completion lymph node dissection (CLND) following a positive SLNB, and we agree with Dale et al. that comprehensive neck dissection was thought to remain the most common modality. However, for the UK, a survey we conducted prior to the advent of immunotherapeutics by the two senior authors (JD, DS) suggested practice in the United Kingdom (UK) was divergent (unpublished data).

Nineteen units who offered head and neck CLND for melanoma in the UK were identified from the skin cancer networks. A cross-sectional survey questioning the management of a positive SLNB in the parotid or neck, including the extent of completion lymph node dissection (CLND), were sent to these units, with a 95% response rate (18 of 19 units). The survey included the extent of CLND and considered factors influencing the decision such as location of primary tumour, location of SLNB, and drainage on lymphoscintogram.

For a positive parotid node, 10 units (56%) performed parotidectomy and comprehensive CLND and 8 units (44%) offered parotidectomy and selective CLND. For a positive neck SLNB; 10 units (56%) offered comprehensive CLND, and 8 units (44%) selective CLND, whilst 1 unit in each group performed ultrasound surveillance for minimal tumour burden. Both site of primary tumour and nodal neck level were deemed to influence extent of selective neck dissection.

Dale et al. report their neck dissection experience from 2007 to 2017, and we assume that many of the cases were for microscopic disease following a positive SLNB. MSLT-II identified that CLND following a positive SLNB has a comparable overall survival to those who undergo ultrasound surveillance.[3] Shortly after this data emerged, adjuvant oncological therapy demonstrating a survival benefit became available, and CLND effectively ceased. Adjuvant oncological therapy in stage 3 disease is licensed following surgi-

cal resection, and current practice is for therapeutic lymph node dissection (not necessarily comprehensive dissection) in the presence of palpable disease. A secondary area for research is to determine whether up front neck dissection is necessary for palpable disease prior to immunotherapy, or alternatively a more limited nodal excision and reserve neck dissection as a salvage procedure.

Predicting who will progress to develop macroscopic disease following a positive SLNB is likely to be determined by the presence of positive non-sentinel lymph nodes (NSLN), yet this is not currently feasible without CLND. Less than 14% of patients in MSLT-II had a head and neck melanoma,[3] and in conjunction with limited evidence, changes in standard of care with provision of adjuvant oncological therapy further clouds the picture, and may present surgeons with a differing issue of more extensive and aggressive regional disease in those who relapse. However, we do know that the vast majority of positive NSLN's are located in the same or adjacent level as the sentinel node,[4] which would support the authors proposal to undertake a selective neck dissection in most cases. In our series of 89 patients having SLNB of the head and neck for melanoma in Hull, 18 were positive of whom eight had a selective neck dissection, of which none relapsed regionally at 3 years follow up.

In 2009, the University of Auckland published their online mapping tool demonstrating predictability of skin lymphatic drainage patterns of the head and neck, and we continue to use it to guide our extent of neck dissection.[5] Dale et al. have further supported this evidence, and combined multi-institutional data can provide definitive evidence of which neck levels can be spared based on primary tumour site.

Ethical approval

N/A.

Declaration of Competing Interest

N/A.

Funding

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References

[1]. Dale J, Rayatt S, White N, Evriviades D, Baden J. Anatomical location of the primary tumour and its relationship to regional lymph node metastasis in cutaneous head and neck melanoma: is selective neck dissection appropriate? *J Plast Reconstruct Aesthet Surg* 2019;**20**:46.

[2]. O'Brien CJ, Petersen-Schaefer K, Ruark D, Coates AS, Menzie SJ, Harrison RI. Radical, modified, and selective neck dissection for cutaneous malignant melanoma. *Head Neck* 1995;**17**(3):232–41.

[3]. Faries MB, Thompson JF, Cochran AJ, et al. Completion dissection or observation for sentinel-node metastasis in melanoma. *N Eng J Med* 2017;**376**:2211–22.

[4]. Gyorki DE, Boyle JO, Ganly I, et al. Incidence and location of positive nonsentinel lymph nodes in head and neck melanoma. *Eur J Surg Oncol* 2014;**40**:305–10.

[5]. Reynolds HM, Smith NP, Uren RF, Thompson JF, Dunbar PR. Three-dimensional visualization of skin lymphatic drainage patterns of the head and neck. *Head Neck J Sci Spec Head Neck* 2009;**31**(10):1316–25.

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