



Case Report

Sciatic Nerve Transection Following Prosthetic Buttock Augmentation: First Reported Case and Review of the Literature

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Abstract

Gluteal augmentation is typically carried out by implant placement or autologous fat grafting. Over recent years, there has been a significant increase in the number of gluteal augmentations being performed. However, because the number of procedures has increased, so too have the number of complications. We present a case of a 33-year-old female with an implant infection with concomitant sciatic nerve transection following bilateral gluteal augmentation with implants leading to a permanent foot drop. Although transient sciatica because of compression has been described as a complication of gluteal augmentation, this is the first reported case, to our knowledge, of transection. The many unusual management decisions that had to be made when faced with this rare and devastating complication are highlighted and the relevant literature on gluteal augmentation is discussed. Patients and surgeons alike need to take particular care when considering this procedure.

Level of Evidence: 5 (Diagnostic)

A beautiful buttock is becoming increasingly more appealing to the public.¹ Over recent years, there has been a significant increase in the number of gluteal augmentations being performed.²⁻⁴ However, because the number of procedures has increased, so too have the number of complications.⁵

Although the concept of a beautiful buttock has changed over time, it is currently thought to have a point of maximum prominence at the level of the mid buttocks, with 50% of the gluteal tissue above and below the point of maximal projection as well as a waist-to-hip ratio of 0.7.^{6,7} Other important aspects of beautiful buttocks include lateral depressions, short infragluteal folds, supragluteal fossets and a v-shaped crease of the sacral triangle.⁸

Gluteal augmentation is done by implant placement or autologous fat grafting (commonly called a Brazilian Butt Lift [BBL]) with autologous fat grafting being the commonest.⁹

We report a case of implant infection with concomitant sciatic nerve transection following gluteal augmentation with implants leading to a permanent drop foot. Although transient sciatica because of compression has been described as a complication of gluteal augmentation, this is the first reported case, to our knowledge, of

transection.⁷ We highlight the many unusual management decisions that had to be made when faced with this rare complication.

CASE REPORT

A 33-year-old female patient presented to the senior author with a right foot drop after a bilateral gluteal augmentation done in another country 5 months before. The patient gave a history that she originally had a gluteal augmentation with subcutaneous implants 4 years previously to this procedure through a single gluteal cleft incision. She was never happy with the cosmetic result and therefore chose to repeat the procedure 4 years later and had the implants placed

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in a submuscular plane. Although also done in the same country, this was done by a different surgeon, who decided to utilize 2 incisions on either side of the original incision. She experienced paresthesia in both feet with pain and weakness in the right foot, immediately after this augmentation. An ultrasound scan revealed that there was fluid around both implants and 6 days later the patient returned to the operating room for the evacuation of bilateral hematomas. The surgeon, who was concerned about injury to the sciatic nerve, demonstrated a seemingly intact sciatic nerve in a Video. The implants were then re-inserted.

Her symptoms persisted and her surgeon reassured her that this weakness takes time to resolve. She was keen to return to her home country and decided to take 1 h flight home 3 weeks later. Soon after this flight, however, both of her wounds dehiscd. After seeking a second opinion from a plastic surgeon in her country, it was recommended that the wound be allowed to heal by secondary intention. The left wound healed after 1 month; however, the right wound continued to drain fluid.

When she was examined by the senior author, the patient had a complete foot drop with the typical gait seen in these patients and there was global atrophy of the lower leg muscles of the right leg (Figure 1). There was decreased power (0/5) of the tibialis anterior and calf muscles and decreased sensation of L4/L5 and S1 nerve root distribution.

On examination of the buttock, an old midline scar was seen in the natal cleft, with more recent double-tramlined scars on either side, with an oozing, chronic wound of the right scar (Figure 2). A microbiology sample grew a sensitive *Staphylococcus aureus*.

To evaluate the sciatic nerve further, the patient had an MRI of the pelvis and both legs. This demonstrated that the right sciatic nerve could be followed until the right piriformis muscle group, where it became thickened and hyperintense in appearance. It could not be identified between the obturator internus and buttock implant, where it should normally be visible. It could, however, again be identified along the proximal thigh at the level of the gluteus maximus/lesser trochanter region, lying adjacent to the inferolateral aspect of the right implant. The sciatic nerve appearance within the proximal right thigh demonstrated thickening with an increased signal intensity (indicating edema because of nerve pathology). This increased signal intensity could be seen throughout the course of the nerve, including the common peroneal and tibial nerves.

On the left, the sciatic nerve could be followed across the left piriformis and was seen between the obturator internus and buttock implant. It could then be seen to exit the pelvis between the external rotators and the buttock implant. The left sciatic nerve demonstrated only mild thickening and a slight increase in signal intensity in only half of the sciatic nerve fascicles. The remainder of the left sciatic nerve demonstrated normal signal intensity. The increased signal intensity with slight nerve thickening was seen to track along the tibial nerve. The common peroneal nerve signal intensity was within normal limits with no thickening.

There were signs of denervation edema with muscle bulk loss and fatty infiltration involving the distribution of the sciatic nerve and its major branches on the right, while only involving muscles of a portion of the distribution of the sciatic nerve and the tibialis posterior nerve on the left.

The patient was then referred to a neurologist for evaluation and nerve conduction studies of the right leg. It was found that there was absent conduction within the tibial and peroneal nerves. Needle



Figure 1. A 33-year-old female with atrophy of right calf muscles 5 months after bilateral buttock augmentation.

electromyography of the tibialis anterior and gastrocnemius on the right confirmed denervation, without any signs of reinnervation.

The patient essentially had double pathology: an injured, possibly transected, sciatic nerve and an infected prosthesis pocket with an associated draining wound. This raised multiple questions and because of the rarity of the case, the senior author sought advice from numerous specialists in different disciplines. Discussions revolved around many issues, such as, whether one removes both implants at the same time, potentially compromising the skin bridge and wound healing capacity in between the incisions, especially because there was a midline scar too. Another question revolved around whether to explore and repair the nerve at the same sitting, despite the presence of bacterial contamination of the repair site. And, whether it be worth exploring/repairing the nerve at all, considering the time delay (5 months), rate at which nerve growth takes place (1 mm/day) and the distance between the point of injury and the motor endplates (>40 cm). With motor endplates usually degenerating after 1 year, it would seem pointless to undertake a repair that would result in axons reaching the endplates almost one and a half years after injury. It could also be argued that if there were any intact motor fibers, one could potentially damage these during dissection and repair of the nerve within the thick scar tissue.

However, this argument had to be tempered with the argument that repairing the nerve could at least restore protective sensation, albeit at the expense of damaging any intact motor fibers (that



Figure 2. Double tramlining of scars with oozing, chronic wound at the inferior aspect of the right scar of a 33-year-old female 5 months after bilateral buttock augmentation.

have only had neuropraxia), which would in all likelihood not reach their motor endplates in time. The consensus was in favor of the repair, despite the contaminated pocket, providing it was possible to dissect the nerve without damaging other intact structures. A surgeon, who had extensive experience in sciatic nerve surgery, was therefore asked to join on the day of her surgery. It was also decided that it would be safer for blood flow and wound healing to stage the removal of the 2 implants, at least 2 weeks apart, and only make an incision to remove the right implant in the first stage.

The right scar was excised, and an intact implant was removed. As expected, the cavity was lined with chronic granulation tissue, beneath which there was a thick scar capsule. The infected granulation tissue was curetted and the cavity was thoroughly irrigated. The thick underlying scar capsule made it risky to identify underlying structures and it was therefore decided not to explore the nerve in this tissue and, instead, attempt to identify it in virgin tissue, through a gluteal fold incision. The nerve was easily identified at this level and dissected rostrally until the level of the inferior edge of the scar capsule, where the nerve substance was found to diminish in consistency and terminate in firm scar tissue (Figure 3, Video).

It was decided not to dissect the nerve any further, partly because the proximal trunk was heavily caked in the scar tissue of the capsule and partly for fear of damaging potential fibers (sensor and motor) that may be intact. The inferior gluteal wound was irrigated and a

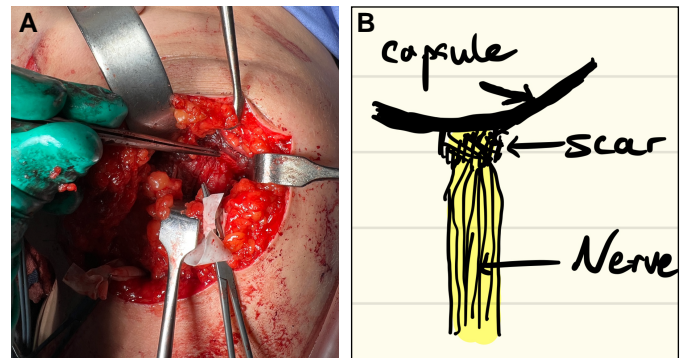


Figure 3. (A) Sciatic nerve terminating in scar tissue in a 33-year-old female 5 months after bilateral buttock augmentation. (B) Diagram from senior author's surgical note illustrating the findings in A.



Video. Watch now at <http://academic.oup.com/asjopenforum/article-lookup/doi/10.1093/asjof/ojae084>

drain was inserted into the buttock pocket. Both wounds were then closed in layers with resorbable sutures.

On the sixth postoperative day, the wound drain was removed, and both wounds were healing well (Figure 4), and plans to remove the contralateral implant 8 days later were on track.

On the day before the second stage, the medial aspect of the infra-gluteal wound developed erythema and exudate and the underlying tissue had a firm consistency (Figure 5). It was decided to explore this area during the second stage too.

At the second stage, the left implant removal process and wound closure were similar to that of the right implant, except that there was no chronic granulation tissue found in the cavity. It was nevertheless curetted and irrigated before closure.

The right inferior gluteal wound was opened at maximal firmness and some necrotic fat and sero-bloody fluid were found and debrided. This was sent for culture but found to have no growth, in keeping with fat necrosis. The wound did not track >2 cm and was not in communication with the previous implant pocket and was therefore resutured.

The postoperative course was uneventful and all wounds healed well (Figure 6).

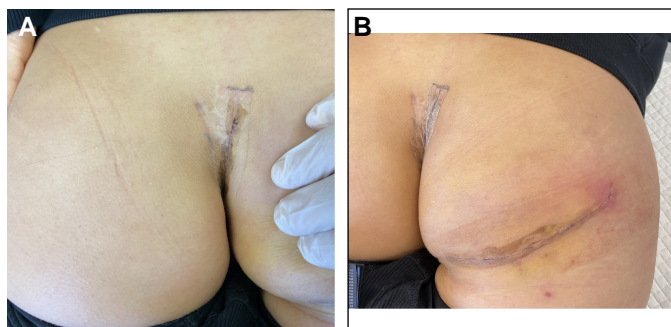


Figure 4. (A) and (B) show both natal cleft and gluteal wounds healing unevenly on the sixth postoperative day in the 33-year-old female described in this report.

Within a few weeks after her recovery, the patient returned to her home country and wounds remained healed. She remained distraught that she could not walk properly and eventually consulted a surgeon in Israel, who decided to attempt a nerve repair. At the time of writing the article (10 months postrepair), the patient had reported no recovery of power and still used a foot-drop splint but claimed her gait had improved and she also had somewhat improved sensation and pain.

DISCUSSION

Gluteal augmentation is done by implant placement or autologous fat grafting (commonly called a BBL). The majority of plastic surgeons use autologous fat grafting for gluteal augmentation, with 92% of gluteal augmentations done this way and only 8% using implants.⁹ Implants used to be the preferred technique, but because of the relatively high rate of complications, autologous fat grafting has become the primary method.¹⁰

A 2022 systematic review found implants to have a 25% complication rate, whereas autologous fat grafting only had a 13% complication rate.¹ Autologous fat grafting's most common complications included seroma, under-correction, infection, and transient sciatica.¹¹ However, autologous fat grafting is also associated with the deadly complications of fat embolism.^{1,10,11} The fatalities because of fat embolism are thought to be because of direct injection of fat into a gluteal vein or injury to a gluteal vein, allowing fat to embolize toward the heart and lungs.^{1,12} It has been particularly associated with intramuscular fat injection, because this layer is much closer to the major veins in the region.¹ The mortality rate of autologous fat grafting is ~1 in 3000, the highest of any aesthetic procedure.⁷ Therefore, although implants have a higher rate of complications, autologous fat grafting is associated with the more catastrophic complication of embolism and death.^{1,10,11}

The most common complications caused by implants, on the other hand, are wound seromas and wound dehiscence, with a dehiscence rate of ~30%.² The midline incision used for implants is often in the intergluteal crease, a watershed area without a major identifiable arterial blood supply, which is thought to be the cause of poor wound healing.² In the reported case, the initial augmentation was done through this incision, but the second surgery was undertaken through incisions immediately adjacent to the midline incision, thereby potentially compromising the perfusion of the medial skin edges



Figure 5. Medial aspect of infragluteal wound, overlying ischium, with erythema and exudate 13 days after removal of buttock implants and exploration of right sciatic nerve in the 33-year-old female described in this report.

of these wounds. The latter could possibly explain why she developed wound dehiscence in both of her wounds following that surgery.

Other implant complications include infection, displacement of the implant, and visual irregularities of the buttocks.^{1,10} Transient sciatic nerve paresthesia's and pain because of postoperative swelling or pressure on the sciatic nerve by the implants in the early postoperative period have been reported, ranging between 1.1% and 20%.^{2,5,10,11} However, all other descriptions are for a transient sciatica that resolves within several weeks.^{2,5,11} This is the first reported case of sciatic nerve transection resulting in a permanent drop foot.

It is important to understand the anatomical planes (subfascial, intramuscular, and submuscular) that are available for implant placement and how these could affect the risk of nerve injury.

Most surgeons utilize the subfascial or intramuscular planes.^{3,13} It is ill-advised to place implants subcutaneously because of implant mobility, displacement, ptosis, and patient dissatisfaction.² Similarly, the submuscular space is smaller than that found in the intramuscular plane, difficult to identify and in direct continuity with the sciatic nerve.² The sciatic foramen is the caudal limit for dissection of the submuscular plane, and therefore creating a complete submuscular pocket would risk traction or transection of this nerve.¹⁴ This most caudal part of the pocket is also the furthest away from the incision and difficult to visualize during dissection and it is likely that a surgeon could injure or transect the nerve without realizing it, as was apparent in this case. The surgeon demonstrated that the nerve was intact in a Video, at a level close to the incision, but failed to realize that the transection occurred more distally, at the caudal end of the pocket. It is for this reason that many prefer the intramuscular rather than the submuscular plane. By using the intramuscular plane, the muscle fibers above the implant provide adequate coverage of the implant, whereas the fibers below protect the sciatic nerve.^{5,8}



Figure 6. All wounds healed well at the 2 week follow-up after removal of left buttock implant and debridement of right infragluteal wound in the 33-year-old female described in this report.

Over and above making us acutely aware of the potential for this devastating complication, this article highlights relevant discussion points, such as whether it is appropriate to repair a nerve in the face of infection or not, and whether a repair is warranted when considering the time delay. The risks of wound complications when tramlining scars are also highlighted. This patient also received surgery in different countries, raising the issue of cosmetic surgery tourism. A recent study on cosmetic surgery tourism found that the major reason for travel was lower cost.¹⁵ Interestingly, it was noted in that study that all of the major complications reported were because of gluteal augmentation (both fat grafting and prosthetic).¹⁵

CONCLUSIONS

Despite being a procedure with potentially devastating complications, the number of gluteal augmentation procedures is rapidly increasing. Patients and surgeons alike need to take particular care when considering this procedure. This case highlights one of the most devastating complications (nerve transection) after such a procedure and the management decisions following this.

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