Foot drop post body contouring surgery: The cost of a six-pack?

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With over 140,000 procedures per year, body contouring surgeries, like abdominoplasty, are one of the most common and rapidly increasing cosmetic procedures.[1] Despite this vast spread, the popularity of this procedure is expected to increase even further due to the rising demand for post–massive weight loss contouring procedures and increase in the overall number of aesthetic surgery procedures.[1] Given the growing number of abdominoplasties being performed, it is increasingly important for both physicians and patients to acknowledge the possible complications of this procedure. A group of these complications include different nerve injuries due to incisional, or less commonly, positional consequences.[1] In a systemic review, Ducic et al[1] concluded that 1.94% of patients sustain nerve injury during abdominoplasty, but only 0.19% of those injuries affect the sciatic nerve.

We present a 25-year-old (otherwise healthy) male who developed left foot drop immediately after body contouring surgery (abdominoplasty and bilateral inner thigh lift). Having experienced a dietary weight loss, from 124 to 84 kg, within the past 12 months and able to maintain this for a few additional months, the patient decided to undergo this single-session body contouring surgery. During the four-hour procedure, the patient was kept in either a frog position (hip abduction, hip and knee flexion, and the soles of the feet touching each other) or a semi-recumbent position on a polyurethane foam mattress for approximately one hour (**Figure 1**). Immediately after the surgery, while recovering from anesthesia, the patient started to complain of progressive left-leg pain and weakness. Neurological examination revealed isolated and complete left sciatic neuropathy with sensory loss and "foot drop" (i.e. 0/5 strength of the left dorsiflexors, toe extensors, and evertors and 2/5 strength of the left plantar flexors). Laboratory tests, including a nutritional (i.e. vitamins and minerals) and metabolic workup, and pelvic radiographs were performed and found to be negligible. A comprehensive electrodiagnostic study was then performed. Motor nerve conduction study was performed for bilateral tibial and peroneal nerves. Disc recording electrodes were placed over extensor digitorum brevis and abductor hallucis for peroneal and tibial nerves respectively. Peroneal nerve was stimulated at the ankle, head of fibula and lateral popliteal fossa bilaterally. Tibial nerve was stimulated at the ankle and popliteal fossa bilaterally. Compound muscle action potential amplitudes were markedly reduced for the left peroneal (1.44 mv compared to 5.8 mv on the right side) and tibial nerves (1.16 mv left side compared to 8.2 mv right side). Conduction velocities were mildly reduced for left side compared to right side (left peroneal 33.9 m/s and tibial 35.4 m/s compared to right peroneal 42 m/s and tibial 40m/s). Sensory nerve conduction study was done for sural nerve bilaterally by using bar recording electrodes just posterior to lateral malleolus and stimulating 14 cm proximally in the posterolateral calf. Sural nerve potential was absent on the left side. Right side sural nerve showed a conduction velocity of 40.2 m/s and amplitude of 10.2 microV. Needle electromyography of the left lower limb was performed using disposable concentric needle electrodes. There were profuse denervation potentials (fibrillations and positive sharp waves) in the tibialis anterior and semitendinosus muscles and few denervation potentials in the gastrocnemius and biceps femoris (short head) muscles. On studying the voluntary activity, there was a gross reduction in recruitment of motor unit action potentials (MUAPs) with few polyphasic potentials in the semitendinosus, biceps femoris (short head), gastrocnemius, and tibialis anterior muscles. Needle

Figure 1- Photograph shows the semi-recumbent and 'frog position' and the yellow line illustrates the course of the sciatic nerve.

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electromyography of vastus lateralis was unremarkable. Overall, the patient was diagnosed with compression neuropathy of the left sciatic nerve, with features of axonal loss and demyelination. Intensive physiotherapy, including a range of motion and strengthening exercises, functional electrical stimulation, and a supportive ankle-foot orthosis, was commenced. At a six-month follow-up, the plantar flexors had regained 5/5 strength; however, significant residual weakness of the dorsiflexors remained (2/5). The patient maintained an ankle-foot orthosis for mobility.

In our case, the combined picture of axonal loss and segmental demyelination was suggestive of the compression neuropathy of the sciatic nerve. According to the literature, this is the third report of a sciatic nerve injury secondary to abdominoplasty. In the previous 2 cases, the cause of the sciatic nerve injury was attributed to the traction/compression caused by the frog position, specifically the prolonged hip flexion and knee extension to allow for assessment of the inner thighs, combined with a semi-recumbent position to allow for simultaneous abdominal closure.[2,3] Clinicians should note that it is highly conceivable that this positioning, if prolonged may cause compression of the sciatic nerve during any operational case.

Although this positioning is widely established and the risk of peripheral neuropathy is more likely due to nutritional deficiencies after weight loss, a strong clinical suspicion, the availability of nerve conduction studies, and an anatomical understanding are necessary to diagnose these rare cases. Similarly, in the literature, Winfree et al[4] associated other surgical positions with the cause of different compression neuropathies. Hence, further research is required to familiarize, objectively quantify, and clearly highlight for physicians the absolute risk of a patient undergoing compression neuropathy during body contouring procedures. This risk quantification should be in regard to different surgical positions, time spent in each position, body habitus, and the anatomy/nerve involved. In addition, despite our electrophysiological findings we advocate further MRI evaluation of the proximal sciatic nerve which could have added a better clinical correlation of the findings. Consequently, we are unable to dissuade the speculation of other possible causes of this neuropathic condition. Thus, due to this study design skepticism lingers in regards to the definite cause of the observed adverse effect.

Last but not least, for similar cases, we suggest avoiding combinations of surgeries that lead to having to adjust patients into multiple positions (e.g. frog and semi-recumbent) to decrease compression and complications, as discussed in the literature.5 After all, undergoing surgery in the hope of a six-pack and ending up with foot drop is quite disastrous.

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