**Table.** Lower limb volume assessment by truncated cone formula (Kuhnke formula), before and after exercise (walking) or postural condition (standing and sitting), with and without graduated compression stockings (*GCS*)

| | Limb volume before sampling (mean ± SD), mL | Limb volume after sampling (mean ± SD), mL | Mean variation, % | *P* | |
|---|---|---|---|---|---|
| Walking, no GCS | 2513 ± 406 | 2525 ± 413 | 0.4 | NS | – |
| Walking, GCS | 2469 ± 432 | 2361 ± 416 | −4.4 | .0001 | ↓ |
| Standing, no GCS | 2493 ± 399 | 2561 ± 392 | 2.7 | .0001 | ↑ |
| Standing, GCS | 2497 ± 386 | 2381 ± 367 | −4.6 | .0001 | |
| Sitting, no GCS | 2534 ± 402 | 2547 ± 380 | 0.5 | NS | – |
| Sitting, GCS | 2483 ± 400 | 2362 ± 406 | −4.8 | .0001 | ↓ |

*NS*, Not significant; *SD*, standard deviation.

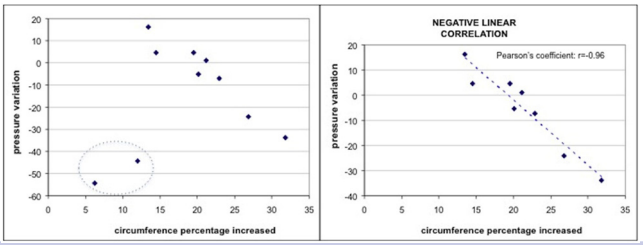


**Fig.** Negative linear trend between lower limb circumference and interface pressure variation. Excluding the two outliers leads to a strong negative correlation (Pearson coefficient, $r = -0.96$).

**Background:** The literature supports use of graduated compression stockings (GCS) for leg edema. Nevertheless, there is a paucity of data on the GCS effect related to sitting, standing, and walking on limb edema. Data on different limb shapes and their impact on GCS-exerted pressure are lacking. This investigation provides evidence-based information on GCS effect on edema reduction and the limb shape impact on GCS pressure.

**Methods:** Thirty healthy individuals (15 male, 15 female; mean age, 32 ± 5 years) were included. All the participants underwent lower limb volume (Kuhnke formula) and bioimpedance (Biody Xpert II; eBiody SAS, La Ciotat, France) measurement, before and after sitting for 30 minutes, wearing below-ankle noncompressive socks. The same assessment was repeated 7 days later, in the same individuals, but wearing a below-knee 16 to 20 mm Hg GCS.

At a 7-day interval, 1 week with below-ankle noncompressive socks and 1 week with below-knee 16 to 20 mm Hg GCS, all the participants repeated the same protocol including standing and walking. Ten individuals underwent bioimpedance assessment before and after sitting, standing, and walking. In the same group, B and B1 interface pressure values were measured.

**Results:** All 60 limbs completed the data collection. Sitting or walking, without GCS, led to no significant volume changes, whereas volume was decreased by the use of GCS (−4.8% [$P < .00001$] and −4.4% [$P < .00001$], respectively). Standing up, without GCS, led to an increase in volume (2.7%; $P < .0001$), whereas limb volume was decreased (4.6%; $P < .0001$) by use of GCS (Table).

Bioimpedance showed an extracellular water reduction only while walking with GCS (from 40.55% ± 1.66% to 40.45% ± 1.71%; $P < .017$). Mean interface pressure was 19 ± 5 mm Hg (B) and 16 ± 5 mm Hg (B1). The interface pressure variation from B to B1 was not homogeneous among participants (mean percentage variation of −13% ± 25%, ranging from −54% to 16%).

The Fig shows a negative linear trend between pressure variation and circumference percentage increase. The subanalysis excluding the two outliers shows a strong negative linear correlation (Pearson coefficient, $r = -0.96$).

**Conclusions:** GCS led to a significant limb volume reduction irrespective of limb position and muscle pump function. However, extracellular fluid is mobilized only during muscle walking with GCS. Interestingly, leg shape variation influences the interface pressure gradient, indicating the importance of proper fitting of both B and B1 during prescription. These data provide a foundation for future investigations dealing with GCS effect on fluid mobilization and with limb geometry impact on compression performance.

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## Total Laparoscopic Removal of Inferior Vena Cava Filters

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**Background:** Indwelling inferior vena cava (IVC) filters can cause significant complications. With more frequent use of optional IVC filters, there has been increasing need for filter retrieval procedures. Perforations of the IVC wall by the struts of the filter are frequent. These complicated filters have increased because of low retrieval rates. Some filters cannot be removed through endovascular techniques. In this study, we report our experience of total laparoscopic removal of IVC filters in eight patients when the struts were nonretrievable through an endovascular approach.

**Methods:** Retrospective analysis was performed of eight patients who underwent filter laparoscopic retrieval procedures between December 2016 and July 2018 . Seven patients had the Celect filter (Cook Medical, Bloomington, Ind) placed. One patient had the Denali (Bard, Covington, Ga) filter implanted. In all patients, an attempt to remove the filter by means of the standard percutaneous procedure failed. Eight cases of IVC filter removal due to caval perforation were identified by computed tomography venography. Patients' demographics, clinical presentation, laparoscopic indication and technique, and outcomes were recorded.

**Results:** Six patients were male, and the median age was 45 years (24-58 years). All IVC filters were the retrievable type and had an average indwelling time of 4.2 months (2-10 months). In each patient, removal had been attempted at least two times through endovascular retrieval. One filter was implanted above the left renal vein. Seven patients underwent total laparoscopic surgical removal of complicated IVC filters, which included six Cook Celect filters and one Bard Denali filter. Open surgical removal of the filter that could not be removed by laparoscopy was performed in one patient. The total removal rate was 100%, and the laparoscopic retrieval rate was 87.5%. All patients recovered well after the operation. No death related to laparoscopic and open removal occurred.

**Conclusions:** Total laparoscopic removal with minimally invasive IVC manipulation is feasible for extraction of complicated IVC filters that cannot be removed with an endovascular procedure. Laparoscopic removal is associated with excellent outcomes and minimal morbidity.

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## Is Compression Required After Radiofrequency Ablation? A Randomized Controlled Trial

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**Background:** With endovenous procedures becoming increasingly preferred to open surgical operations, radiofrequency ablation (RFA) is now established as an efficacious endothermal modality for superficial truncal incompetence. Postprocedure limb compression, hitherto