

Ankle-Level Versus Below-Knee Great Saphenous Vein Stripping in Patients with Saphenofemoral Junction and Dodd Perforator Incompetence: A Retrospective Comparative Study

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Submitted: 25 July 2026

Accepted: 09 September 2026

Published: 11 September 2026

ABSTRACT

Background: The optimal distal extent of great saphenous vein (GSV) stripping remains uncertain when saphenofemoral junction and Dodd perforator incompetence coexist. This study compared ankle-level and below-knee GSV stripping for perioperative outcomes, complications, and recurrence. **Methods:** This retrospective comparative cohort study included 142 patients with primary varicose veins (CEAP C2–C4) and duplex-confirmed saphenofemoral junction and Dodd perforator incompetence treated at Tobruk Medical Center between January 2021 and December 2023. Ankle-level stripping was performed in 68 patients and below-knee stripping in 74. The primary outcome was recurrence during available follow-up. Secondary outcomes were operative time, hospital stay, time to ambulation, surgical-site infection, and saphenous nerve paraesthesia. Continuous outcomes were compared using Welch's independent-samples t tests, and categorical outcomes using two-sided Fisher's exact tests. Effect estimates are reported with 95% confidence intervals (CIs). **Results:** Mean operative time was longer with ankle-level than below-knee stripping (78.5 ± 12.3 vs 65.2 ± 10.8 min; mean difference 13.30 min, 95% CI 9.44 to 17.16; $p < 0.001$). Hospital stay and time to ambulation did not differ significantly. Recurrence occurred in 5 of 68 patients (7.4%) after ankle-level stripping and 5 of 74 patients (6.8%) after below-knee stripping (risk ratio [RR] 1.09, 95% CI 0.33 to 3.60; $p = 1.000$). Surgical-site infection occurred in 3 patients (4.4%) and 2 patients (2.7%), respectively (RR 1.63, 95% CI 0.28 to 9.48; $p = 0.670$). Saphenous nerve paraesthesia occurred in one patient (1.5%) after ankle-level stripping and none after below-knee stripping. Median follow-up was 28 months. **Conclusion:** Ankle-level stripping was associated with longer operative time, whereas no statistically significant differences were detected in observed recurrence, hospital stay, time to ambulation, or postoperative complications. These findings do not establish equivalence between the approaches. The distal extent of GSV stripping should be individualised according to reflux anatomy and clinical circumstances.

Keywords: great saphenous vein; varicose veins; vein stripping; saphenofemoral junction; perforator incompetence; recurrence.

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Introduction

Chronic venous disease is a common vascular disorder of the lower limbs and encompasses a broad clinical spectrum, ranging from uncomplicated varicose veins to oedema, skin changes, and venous ulceration. The Clinical-Etiological-Anatomical-Pathophysiological (CEAP) classification provides a standardised framework for describing the clinical severity and anatomical distribution of venous disease and is widely used in clinical practice and research.¹ Great saphenous vein (GSV) reflux is a major pattern of superficial venous incompetence, and duplex ultrasonography is the principal investigation for confirming reflux, defining its anatomical extent, and planning treatment.^{2–4}

The management of symptomatic GSV incompetence has changed substantially with the development of endovenous techniques. Current international guidelines generally recommend endovenous ablation when appropriate expertise and facilities are available.^{2–4} Nevertheless, high ligation and surgical stripping remain established treatment options when endovenous treatment is unavailable, anatomically unsuitable, or not feasible because of clinical or resource-related factors. Surgical stripping can provide durable treatment of GSV incompetence, although recurrent varicose veins remain an important long-term outcome.^{5, 6}

When surgical stripping is performed, the distal extent of GSV removal is an important technical consideration. The vein may be stripped to the knee, below the knee, or towards the ankle according to the anatomical distribution of reflux. Extending stripping distally may permit removal of a longer refluxing venous segment when incompetence extends into the lower leg. However, the anatomical relationship between the GSV and the saphenous nerve becomes increasingly close below the knee, particularly in the distal leg, creating a potential risk of sensory nerve injury when stripping is extended towards the ankle. Saphenous nerve injury may present as paraesthesia, numbness, dysaesthesia, or other sensory disturbance along the medial aspect of the leg and foot.^{7, 8}

Previous studies examining the extent of GSV stripping have demonstrated the clinical importance of balancing treatment of pathological reflux against the risk of nerve injury. More extensive distal stripping has been associated with an increased risk of postoperative saphenous nerve disturbance.^{7, 9} Sensory abnormalities following GSV stripping may persist in some patients.⁸ Conversely, limiting stripping solely to avoid nerve injury may leave a refluxing distal venous segment in patients with more extensive disease. Evidence therefore supports tailoring the distal extent of treatment to the distribution of reflux demonstrated by preoperative duplex ultrasonography rather than applying the same anatomical endpoint to all patients.^{2–4, 9}

Recurrence remains an important consideration following treatment of primary varicose veins. Recurrent disease may arise through several mechanisms, including persistent or recurrent truncal reflux, progression of venous disease, reflux in accessory or perforating veins, and neovascularisation in the region of a previously treated saphenofemoral junction. Long-term surgical studies have shown that GSV stripping can reduce the need for reoperation compared with saphenofemoral ligation alone, although recurrence may still develop during follow-up.^{5, 6}

Perforator incompetence may coexist with truncal superficial venous reflux and contribute to a more complex anatomical pattern of venous disease. Incompetence of the thigh perforator traditionally referred to as the Dodd perforator may occur together with saphenofemoral junction and GSV incompetence. Current guidelines emphasise assessment of the overall pattern of superficial and

perforator reflux by duplex ultrasonography, while the clinical significance and treatment of individual incompetent perforators depend on the distribution and severity of venous disease.^{3,4}

Although substantial evidence is available comparing surgical stripping with endovenous treatment, fewer studies have directly examined the clinical consequences of different distal levels of GSV stripping. Evidence is particularly limited for patients with combined saphenofemoral junction and Dodd perforator incompetence. In this setting, extending stripping towards the ankle may allow treatment of more distal reflux but may also increase operative exposure and the potential for saphenous nerve injury. The present study therefore compared ankle-level and below-knee GSV stripping in patients with primary varicose veins and duplex-confirmed saphenofemoral junction and Dodd perforator incompetence. The primary outcome was recurrence during follow-up. Secondary outcomes were operative time, hospital stay, time to ambulation, surgical-site infection, and saphenous nerve paraesthesia.

MATERIALS AND METHODS

Study Design and Setting

This retrospective comparative cohort study was conducted at the Department of Vascular Surgery, Tobruk Medical Center, Tobruk, Libya. The study included patients who underwent surgical treatment for primary varicose veins between January 2021 and December 2023. Patients were classified according to the distal extent of great saphenous vein (GSV) stripping into an ankle-level group and a below-knee group.

The study was observational and non-randomised. The choice of distal stripping level was based primarily on the anatomical extent of reflux identified on preoperative duplex ultrasonography, together with the operating surgeon's clinical judgement.

Ethical Approval

The study protocol and retrospective review of clinical data were approved by the Research Ethics Committee of the University of Tobruk (Approval No. 45/2024). Patient information was handled confidentially, and all data used for analysis were anonymised. Written informed consent was obtained from all patients for the surgical procedure. Retrospective use of clinical data was conducted in accordance with the requirements of the approving ethics committee.

Study Population

Patients aged 18–70 years with primary varicose veins classified as CEAP clinical classes C2–C4 were eligible for inclusion. All included patients had duplex-confirmed GSV reflux associated with incompetence of the saphenofemoral junction (SFJ) and Dodd perforator.

Patients were excluded if they had secondary varicose veins, a previous history of deep-vein thrombosis, active venous ulceration, previous GSV surgery, a known coagulopathy, or pregnancy. A total of 142 patients met the eligibility criteria and were included in the analysis. Of these, 68 underwent ankle-level GSV stripping and 74 underwent below-knee stripping.

Preoperative Assessment and Duplex Ultrasonography

All patients underwent preoperative clinical assessment and duplex ultrasonography. Duplex examination was used to assess the superficial and deep venous systems, confirm SFJ and GSV incompetence, identify Dodd perforator incompetence, and determine the anatomical extent of superficial venous reflux. Pathological superficial venous reflux was defined as retrograde flow lasting >0.5 seconds. The SFJ and GSV were assessed along their course, and the distribution of reflux was documented for operative planning. The distal extent of stripping was determined primarily by the anatomical distribution of GSV reflux. Ankle-level stripping was generally performed when reflux extended into the distal third of the leg, whereas below-knee stripping was generally performed when reflux was confined to the thigh or proximal leg. Surgeon preference and clinical judgement also contributed to the final operative approach.

Treatment allocation was therefore non-random and reflected both reflux anatomy and clinical judgement.

Surgical Technique

All procedures were performed under spinal anaesthesia. A groin incision was made to expose the SFJ. The GSV was identified, the major tributaries at the SFJ were ligated, and the vein was divided at the junction. The GSV was removed using an invagination stripping technique. In the ankle-level group, stripping was extended distally to approximately 2 cm above the medial malleolus (Figure 1). In the below-knee group, stripping was terminated approximately 10 cm distal to the knee joint (Figure 2). The incompetent Dodd perforator was identified and surgically ligated in all patients. Haemostasis was secured before wound closure, and a compression bandage was applied at the completion of the procedure.

Postoperative Assessment and Follow-up

Patients were assessed during the postoperative period for recovery and procedure-related complications. Operative time was recorded in minutes, hospital stay in hours, and time from surgery to ambulation in hours. Postoperative complications assessed during follow-up included surgical-site infection and saphenous nerve paraesthesia. Saphenous nerve paraesthesia was defined clinically as a postoperative sensory disturbance consistent with the anatomical distribution of the saphenous nerve. Symptomatic deep-vein thrombosis and pulmonary embolism were also recorded as safety outcomes. Clinical follow-up was scheduled at 1 week, 1 month, 6 months, and annually thereafter. Duplex ultrasonography was performed at 6 months and during annual follow-up to assess the treated venous territory and identify recurrent venous reflux or neovascularisation at the SFJ. Follow-up availability was assessed at each predefined time point. Missing follow-up observations were not imputed.

Study Outcomes

The primary outcome was recurrence during the available follow-up period. Recurrence was defined as duplex-documented recurrent venous reflux involving the previously treated GSV territory or neovascularisation at the SFJ. Secondary outcomes were operative time, duration of hospital stay, time to ambulation, surgical-site infection, and saphenous nerve paraesthesia. Symptomatic deep-vein thrombosis and pulmonary embolism were additionally assessed as postoperative safety

outcomes. Because follow-up duration varied among patients, recurrence was analysed as the crude observed proportion of patients with documented recurrence during the available follow-up period rather than as a time-to-event outcome.

Data Collection

Demographic, clinical, operative, postoperative, and follow-up data were obtained retrospectively from medical records and available follow-up documentation. Variables collected for analysis included age, sex, body mass index (BMI), CEAP clinical class, operative approach, operative time, duration of hospital stay, time to ambulation, postoperative complications, recurrence, and follow-up status.

Data were reviewed according to predefined eligibility criteria before inclusion in the analysis. Follow-up availability was recorded at each scheduled interval. Patients without information available at a particular follow-up point were not assumed to be free from recurrence at that time point.

Study Size

All 142 eligible patients treated during the predefined study period were included, comprising 68 patients who underwent ankle-level stripping and 74 who underwent below-knee stripping. Because all eligible patients were included, no prospective sample-size calculation was performed.

Statistical Analysis

Continuous variables were summarised as mean $\pm$ standard deviation (SD), and categorical variables as frequencies and percentages. Baseline demographic and clinical characteristics were presented descriptively. Between-group comparisons of continuous outcomes were performed using Welch's independent-samples *t* tests. Mean differences were calculated as ankle-level minus below-knee stripping and are reported with 95% confidence intervals (CIs). Categorical outcomes were compared using two-sided Fisher's exact tests when expected cell counts were small. For binary outcomes, risk ratios (RRs) with 95% CIs were calculated where estimable. For outcomes with a zero-event cell, Fisher's exact test was used without calculation of a conventional risk ratio. All statistical tests were two-sided, and a *p* value <0.05 was considered statistically significant. Missing follow-up observations were not imputed, and the number of patients contributing follow-up information at each time point was reported separately. Because follow-up duration varied and individual recurrence dates and censoring times were not available for all patients, Kaplan–Meier or other time-to-event analyses were not performed. Recurrence was therefore analysed as the crude observed proportion of patients with documented recurrence during the available follow-up period. AI-assisted computational support was used solely to verify the reported statistical calculations; the author retains responsibility for verification and interpretation of all statistical results.

RESULTS

A total of 142 patients were included in the study, of whom 68 underwent ankle-level great saphenous vein (GSV) stripping and 74 underwent below-knee stripping. Baseline demographic and clinical characteristics are presented in Table 1. Mean age was 44.2 ± 11.5 years in the ankle-level group and 45.1 ± 10.8 years in the below-knee group. Mean body mass index (BMI) was 27.4 ± 3.8 kg/m² and 27.1 ± 4.1 kg/m², respectively. Men accounted for 28 patients (41.2%) in the ankle-level group and 31 patients (41.9%) in the below-knee group. CEAP C4 disease was present in 23 patients (33.8%) and 25 patients (33.8%), respectively; the remaining patients were classified as CEAP C2–C3.

Table 1. Baseline demographic and clinical characteristics

Characteristic	Ankle-level stripping (n=68)	Below-knee stripping (n=74)
Age, years	44.2 ± 11.5	45.1 ± 10.8
Male sex, n (%)	28 (41.2)	31 (41.9)
BMI, kg/m ²	27.4 ± 3.8	27.1 ± 4.1
CEAP C2–C3, n (%)	45 (66.2)	49 (66.2)
CEAP C4, n (%)	23 (33.8)	25 (33.8)

Data are presented as mean $\pm$ standard deviation or n (%), as appropriate. BMI, body mass index; CEAP, Clinical-Etiological-Anatomical-Pathophysiological classification.

Perioperative and postoperative outcomes are presented in Table 2. Mean operative time was significantly longer in the ankle-level group than in the below-knee group (78.5 ± 12.3 vs 65.2 ± 10.8 min), with a mean difference of 13.30 min (95% CI 9.44 to 17.16; $p < 0.001$). Mean hospital stay was 18.6 ± 4.3 h in the ankle-level group and 18.2 ± 4.1 h in the below-knee group (mean difference 0.40 h, 95% CI -1.00 to 1.80 ; $p = 0.572$). Mean time to ambulation was 6.9 ± 2.0 h and 6.7 ± 1.8 h, respectively (mean difference 0.20 h, 95% CI -0.43 to 0.83 ; $p = 0.533$).

During the available follow-up period, recurrence was documented in 5 of 68 patients (7.4%) in the ankle-level group and 5 of 74 patients (6.8%) in the below-knee group. No statistically significant difference in observed recurrence was detected between the groups (RR 1.09, 95% CI 0.33 to 3.60; $p = 1.000$).

Surgical-site infection occurred in 3 of 68 patients (4.4%) in the ankle-level group and 2 of 74 patients (2.7%) in the below-knee group (RR 1.63, 95% CI 0.28 to 9.48; $p = 0.670$). Saphenous nerve paraesthesia was documented in one patient (1.5%) following ankle-level stripping and in no patients following below-knee stripping (Fisher's exact $p = 0.479$). The paraesthesia resolved within 3 months. No symptomatic deep-vein thrombosis or pulmonary embolism was reported in either group.

Table 2. Perioperative and postoperative outcomes

Outcome	Ankle-level stripping (n=68)	Below-knee stripping (n=74)	Effect estimate (95% CI)	p value
Operative time, min	78.5 ± 12.3	65.2 ± 10.8	MD 13.30 (9.44 to 17.16)	<0.001
Hospital stay, h	18.6 ± 4.3	18.2 ± 4.1	MD 0.40 (-1.00 to 1.80)	0.572
Time to ambulation, h	6.9 ± 2.0	6.7 ± 1.8	MD 0.20 (-0.43 to 0.83)	0.533
Observed recurrence, n (%)	5 (7.4)	5 (6.8)	RR 1.09 (0.33 to 3.60)	1.000
Surgical-site infection, n (%)	3 (4.4)	2 (2.7)	RR 1.63 (0.28 to 9.48)	0.670
Saphenous nerve paraesthesia, n (%)	1 (1.5)	0 (0.0)	Not estimable	0.479

Data are presented as mean ± standard deviation or n (%), as appropriate. CI, confidence interval; MD, mean difference; RR, risk ratio. Mean differences were calculated as ankle-level minus below-knee stripping. Continuous outcomes were compared using Welch's independent-samples t tests. Categorical outcomes were compared using two-sided Fisher's exact tests. Risk ratios are reported where estimable.

Follow-up status is presented in Table 3. Follow-up data were available for all patients at 6 months. At 12 months, data were available for 62 of 68 patients (91.2%) in the ankle-level group and 69 of 74 patients (93.2%) in the below-knee group. At 24 months, follow-up data were available for 45 patients (66.2%) and 50 patients (67.6%), respectively. At 36 months, follow-up data were available for 18 patients (26.5%) and 22 patients (29.7%), respectively. Median follow-up was 28 months.

Table 3. Follow-up status by treatment group

Follow-up time point	Ankle-level stripping (n=68)	Below-knee stripping (n=74)
6 months	68 (100.0)	74 (100.0)
12 months	62 (91.2)	69 (93.2)
24 months	45 (66.2)	50 (67.6)
36 months	18 (26.5)	22 (29.7)

Data are presented as n (%) of the original treatment group with follow-up data available at each time point.

Given the variable duration of follow-up, recurrence was reported as the crude observed proportion of patients with documented recurrence during the available follow-up period; time-to-event estimates were not calculated.



Figure 1. Intraoperative photograph showing ankle-level great saphenous vein stripping, with the distal endpoint approximately 2 cm above the medial malleolus.



Figure 2. Intraoperative photograph showing below-knee great saphenous vein stripping, with the distal endpoint approximately 10 cm distal to the knee joint.

Discussion

This retrospective comparative cohort study compared ankle-level and below-knee great saphenous vein (GSV) stripping in 142 patients with primary varicose veins and combined saphenofemoral junction (SFJ) and Dodd perforator incompetence. Ankle-level stripping was associated with a significantly longer operative time, with a mean difference of 13.30 minutes (95% CI 9.44–17.16; $p < 0.001$). No statistically significant differences were detected in hospital stay, time to ambulation, observed recurrence, surgical-site infection, or saphenous nerve paraesthesia. Recurrence occurred in 5 of 68 patients (7.4%) after ankle-level stripping and 5 of 74 patients (6.8%) after below-knee stripping (RR 1.09, 95% CI 0.33–3.60; $p = 1.000$).

Although the observed recurrence proportions were similar, the wide confidence interval indicates considerable uncertainty, and the findings should not be interpreted as evidence of equivalence. The longer operative time with ankle-level stripping is consistent with treatment of a longer venous segment. This additional operative time was not accompanied by a measurable difference in hospital stay or time to ambulation. Postoperative pain, return to normal activity, patient satisfaction, and quality of life were not assessed; therefore, no conclusions can be drawn regarding these patient-centred outcomes. The principal clinical consideration is whether the distal extent of stripping should correspond to the anatomical distribution of pathological reflux rather than whether the GSV should routinely be stripped to a fixed anatomical level. Current international guidelines emphasise duplex ultrasonography for defining the distribution of superficial venous reflux and planning treatment.^{2–4}

In the present study, ankle-level stripping was generally performed when reflux extended into the distal third of the leg, whereas below-knee stripping was generally performed when reflux was confined to the thigh or proximal leg. Treatment was therefore anatomy directed rather than randomly allocated. This approach is supported by Kostas et al., who prospectively examined the relationship between reflux distribution, stripping length, recurrence, and saphenous nerve injury.⁹ Tibial recurrence was more frequent when the stripping level did not correspond to the preoperative duplex-defined extent of reflux.⁹ Residual refluxing GSV may also contribute to recurrent disease. Joshi et al. found residual GSV reflux in a substantial proportion of limbs presenting with recurrent varicose veins.¹⁰ Together, these findings support treatment of refluxing venous segments but do not justify routine removal of a competent distal GSV.^{9,10}

The potential disadvantage of extending stripping distally is saphenous nerve injury. Previous studies have documented sensory nerve disturbance following GSV stripping.^{7,8} Holme et al. reported a higher incidence of saphenous nerve lesions after complete than partial stripping,⁷ while Morrison and Dalsing documented sensory abnormalities after GSV stripping to the ankle.⁸ Jia et al., in a prospective randomised study of 280 patients, directly compared below-knee and ankle-level stripping and reported fewer postoperative neurological symptoms when the distal GSV was preserved.¹¹ In the present study, saphenous nerve paraesthesia occurred in one patient (1.5%) after ankle-level stripping and in no patients after below-knee stripping, with resolution within three months. Because only one neurological event occurred, the study has very limited precision for assessing comparative nerve-injury risk. The absence of a statistically significant difference should therefore not be interpreted as evidence of equivalent neurological safety.

Recurrence after varicose vein surgery is multifactorial and may result from residual or recurrent truncal reflux, neovascularisation, progression of venous disease, accessory vein incompetence, or perforator incompetence.^{5,6,12,13} Dwerryhouse et al. showed that adding GSV stripping to SFJ ligation reduced subsequent reoperation compared with SFJ ligation alone,⁵ while Winterborn et al. demonstrated that recurrent disease may arise through several anatomical mechanisms during long-term follow-up.⁶ These studies support adequate treatment of pathological reflux but also demonstrate that recurrence cannot be attributed solely to the distal extent of GSV stripping.

Only 10 recurrence events were observed in the present cohort. Although recurrence occurred in 7.4% of the ankle-level group and 6.8% of the below-knee group, the confidence interval around the RR was wide and remained compatible with clinically important differences in either direction. The appropriate interpretation is therefore that no statistically significant difference in observed recurrence was demonstrated, rather than that the two techniques have equal recurrence risk.

Follow-up duration and completeness are important when interpreting recurrence. Prospective long-term studies have shown that recurrent venous disease becomes increasingly apparent with longer surveillance.^{12,14} In the present study, follow-up information was available for all patients at six months, for 62 of 68 patients (91.2%) in the ankle-level group and 69 of 74 patients (93.2%) in the below-knee group at 12 months, for 45 (66.2%) and 50 (67.6%) at 24 months, and for 18 (26.5%) and 22 (29.7%) at 36 months, respectively. Patients with shorter follow-up had less opportunity for late recurrence to be detected. Because individual recurrence dates and censoring times were not sufficiently available for time-to-event analysis, recurrence was reported as a crude observed proportion and should not be interpreted as a cumulative long-term recurrence rate.

Dodd perforator incompetence was present in all included patients, and the incompetent perforator was surgically ligated in both treatment groups. Perforator disease may continue to evolve after treatment. Van Rij et al. demonstrated the development of further incompetent perforators during follow-up after varicose vein surgery,¹³ and Nelzén and Fransson identified persistent or recurrent perforator incompetence during long-term follow-up after combined superficial and perforator surgery.¹⁴ More recently, the LaVaCro study reported that perforator insufficiency accounted for many clinically apparent recurrent varicosities following standardised high ligation and stripping.¹⁵ These findings support perforator incompetence as one potential mechanism of recurrent disease. However, the present study cannot determine the independent effect of Dodd perforator ligation because all patients underwent the same perforator treatment. An important limitation is confounding by indication. Treatment was not randomised: patients with reflux extending into the distal third of the leg were generally selected for ankle-level stripping, whereas patients with more proximal reflux generally underwent below-knee stripping, with surgeon judgement also contributing to treatment selection. The anatomical extent of reflux therefore influenced treatment choice and may also have influenced prognosis. Similar observed recurrence proportions cannot establish that stripping length itself has no independent effect. The findings are consistent with an anatomy-directed approach, but a causal advantage of this strategy cannot be established from the present retrospective study. Similar age, sex, BMI, and broad CEAP distributions also do not establish complete anatomical comparability between the groups. CEAP provides a standardised framework for describing chronic venous disease,¹ but patients within the same clinical class may have different anatomical patterns of reflux. More detailed information on segmental reflux distribution, GSV diameter, reflux severity, perforator characteristics, accessory vein reflux, and relevant deep venous findings would have strengthened the comparison. Postoperative complications were uncommon. Surgical-site infection occurred in 3 of 68 patients (4.4%) after ankle-level stripping and 2 of 74 patients (2.7%) after below-knee stripping. The RR was 1.63, but the 95% CI was wide (0.28–9.48), reflecting the small number of events. No symptomatic deep-vein thrombosis or pulmonary embolism was documented in either group. As systematic screening for asymptomatic thrombosis was not performed, this finding should be interpreted as an absence of documented symptomatic thromboembolic events rather than evidence that postoperative thrombosis did not occur. Open GSV stripping remains relevant when endovenous treatment is unavailable, unsuitable, or not feasible, although current international guidelines generally favour endovenous treatment for symptomatic axial superficial venous reflux when appropriate expertise and facilities are available.^{2–4} The present study does not compare surgical stripping with endovenous treatment; rather, it addresses the distal extent of GSV stripping when open surgery has been selected. Long-term randomised evidence from the RELACS study also demonstrates durable outcomes after high ligation and stripping, although patterns of recurrence differ from those following endovenous laser ablation.¹⁶ Several limitations should be considered. This was a retrospective, single-centre, non-randomised study, and treatment allocation was influenced by reflux anatomy and surgeon judgement. The small numbers of recurrence, infection, and neurological events resulted in wide confidence intervals and limited precision. Only 10 recurrence events occurred, preventing reliable multivariable adjustment. Follow-up completeness declined substantially beyond 12 months, creating a risk of attrition bias and limiting assessment of late recurrence. Individual recurrence and censoring times were not sufficiently available for Kaplan–Meier analysis. Detailed anatomical variables and validated measures of venous disease severity,

postoperative pain, functional recovery, and quality of life were also unavailable. These limitations should be considered when interpreting the findings. Despite these limitations, the study addresses a focused surgical question in patients with duplex-confirmed SFJ and Dodd perforator incompetence. Previous evidence indicates that failure to treat a refluxing distal GSV segment may contribute to recurrent disease,^{9,10} whereas unnecessary distal stripping may increase the risk of saphenous nerve injury.^{7,11} The available evidence therefore supports selecting the distal extent of stripping according to the duplex-defined distribution of reflux rather than routinely applying the same distal endpoint to every patient.^{2-4,9,11}

In conclusion, ankle-level GSV stripping was associated with a significantly longer operative time than below-knee stripping. No statistically significant differences were detected in hospital stay, time to ambulation, observed recurrence, surgical-site infection, or saphenous nerve paraesthesia. However, the small number of outcome events, non-randomised treatment allocation, and incomplete longer-term follow-up prevent firm conclusions regarding comparative recurrence or neurological safety. The distal extent of GSV stripping should therefore be individualised according to duplex-defined reflux anatomy rather than determined by a fixed anatomical endpoint. Prospective multicentre studies with detailed reflux mapping, standardised duplex surveillance, clearly defined clinical and anatomical recurrence outcomes, formal neurological assessment, patient-reported outcomes, and sufficiently complete long-term follow-up are needed.

Artificial Intelligence Use Disclosure

ChatGPT (OpenAI) was used solely for language editing to improve grammar, clarity, and readability. It was not used for scientific content, data analysis, interpretation, or conclusions. All edits were reviewed and approved by the authors.

Conflict of Interest

The author declares no conflict of interest.

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