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Preservation of saphenous trunks

ASVAL

S. Chastanet, P. Pittaluga

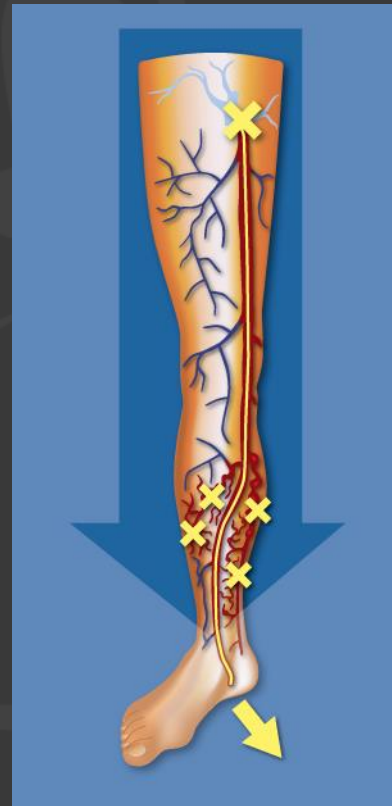
DISCLOSURE OF INTEREST

**I do not have any relevant
financial relationships
with any commercial interest**

Traditionnal Concept of SVI

Descending theory

Valvular hypothesis prevails



HL/S based on
THE DESCENDING
THEORY

THE gold standard ?

Trendelenburg F. Ueber die Unterbindung der Vena Saphena magna bei Unterschenkel Varicen. Beitr Klin Chir 1890-1 ; 7 :195-210

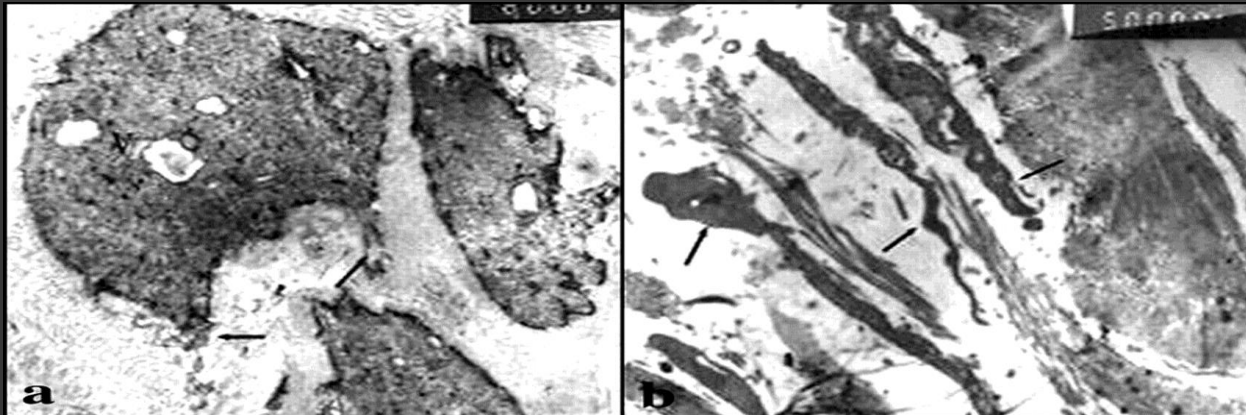
Mayo CH. Treatment of varicose vein. Surg Gynecol Obstet 1906;2:385-388

- ✓ many clinical evidences
- ✓ scientific studies
- ✓ hemodynamic studies

...call into question this theory !!!!

Role of vein wall in the pathogenesis of primary varicose veins

- In conclusion, studying the histopathological changes of varicose veins in comparison to normal ones, revealed that varicose veins showed intimal changes, disturbance in connective tissue components and smooth muscles. These findings supported the theory of **primary weakness of the vein wall** as a cause of varicosity



Elsharawy et al, 2007

Where does the reflux start ?

"Venous wall changes can occur in any segment of the vein irrespective of the site and the function of the valves"
Labropoulos . J Vasc Surg 1997;26:736-42

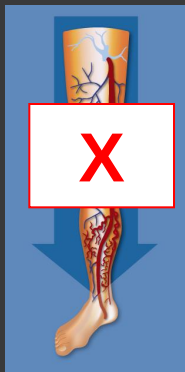


N Labropoulos

**Vein wall could be damaged
anywhere and before the valves**

Study of the venous reflux progression

"This contradicts the traditional assumption that primary reflux develops starting at the SFJ level and proceeds in a retrograde manner "
Labropoulos. J Vasc Surg 2005;26:736-42



**Progression of the disease is from
tributaries towards the saphenous
trunk: ascending/multifocal theory**

Increasing evidences for the ascending evolution theory

Study of the venous reflux progression

Nicos Labropoulos, PhD, DIC, RVT, Luis Leon, MD, Sung Kwon, MD, Apostolos Tassiopoulos, MD, José A. Gonzalez-Fajardo, MD, Steven S. Kang, MD, M. Ashraf Mansour, MD, and Fred N. Littooy, MD, *Maywood, Ill*
J Vasc Surg 2005;41: 291-5.

Patterns of saphenous reflux in women with primary varicose veins

Carlos Alberto Engelhorn, MD, PhD, Ana Luiza V. Engelhorn, MD, MS, Maria Fernanda Cassou, MD, and Sergio X. Salles-Cunha, PhD, RVT, *Curitiba, Paraná, Brazil*
J Vasc Surg 2005;41:645-51.

Age-related variations of varicose veins anatomy

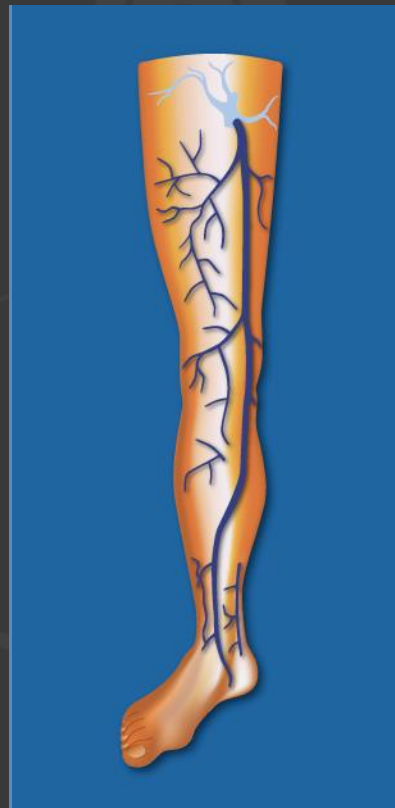
Alberto Caggiati, MD, PhD, Caterina Rosi, BSc, Rosemarie Heyn, VMD, PhD, Marco Franceschini, MD, and Maria Cristina Acconcia, MD, *Rome, Italy*
J Vasc Surg 2006;44:1291-5.

Development of Primary Superficial Venous Insufficiency: The Ascending Theory. Observational and Hemodynamic Data From a 9-Year Experience

Eugenio Bernardini,¹ Paola De Rango,² Riccardo Piccoli,¹ Carlo Bisacci,¹ Valentino Pagliuca,¹ Giuseppe Genovese,¹ and Roberto Bisacci,¹ *Perugia, Italy*
Annals of Vascular Surgery Vol. 24, No. 6, August 2010



The ASVAL method is based on the ascending evolution



**Varices are the cause
of the hemodynamic
trouble**

Trt focused on VR

**= extensive
phlebectomies**

TECHNIQUE



**Tumescent Local Anesthesia with
Exclusive bicarbonate solution**



TECHNIQUE

Tumescent Local Anesthesia with Exclusive bicarbonate solution

- ✓ Atraumatic phlebectomy
- ✓ Micro-incisions
- ✓ Preop US skin mapping



Effect of isolated phlebectomy on saphenous reflux

J Vasc Surg 2009; 50: 107-118

Midterm results of the surgical treatment of varices by phlebectomy with conservation of a refluxing saphenous vein

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Nice and Sainte-Foy-lès-Lyon, France

Background: A new physiopathologic concept within superficial venous insufficiency (SVI) describes ascending progression from the collaterals to the saphenous veins (SV), leading to a treatment that aims to remove the varicose reservoir and not the SVs. This study reports the midterm results of this therapeutic approach.

Methods: This is a retrospective study of patients treated for varices by phlebectomy with conservation of a refluxing SV before July 2004. We evaluated the varicose reservoir by determining the number of zones to be treated (NZT); each lower limb was divided into 32 zones in the preoperative mapping. We performed a clinical and duplex ultrasound examination after 6 months and 1 year, and then once a year until year 4.

Results: Amongst 811 lower limbs operated on for first-time varicose veins, 303 in 221 patients (55 men; 166 women), mean age, 52.7 years (range, 20-93 years), were treated by phlebectomy, with conservation of a refluxing SV. All lower limbs operated on presented preoperative SV reflux >0.5 seconds: great SV (GSV), 85.8%; small SV (SSV), 11.9%; and GSV and SSV, 2.3%. The average NZT was 6.05 (range, 2-10). SV reflux was reduced to < 0.5 seconds in 69.6%, 69.2%, 68.7%, 68.0%, and 66.3% of limbs, respectively, after 6 months, 1, 2, 3, and 4 years of follow-up. Symptoms improved or disappeared in 84.2%, 84.2%, 83.4%, 81.4%, and 78.0% of limbs at each annual check-up until year 4. Freedom of varices recurrence was 95.5%, 94.6%, 91.5%, and 88.5%, respectively at 1, 2, 3, and 4 years. When the NZT was >7, the postoperative varicose recurrence was more frequent (odds ratio, 6.82; $P = .0001$), and the postoperative elimination of SV reflux was more frequent (odds ratio, 4; $P = .037$) as was symptoms improvement (odds ratio, 2.91; $P = .004$). When an ostiotruncal SV reflux extended to the malleolus preoperatively, the elimination of the SV reflux was less frequent (47.6% vs 70.3%; $P < .05$).

Conclusion: Ablation of the varicose reservoir with conservation of a refluxing SV can be an effective treatment in the midterm for the signs and symptoms of SVI and leads to nonsignificant SV reflux in more than two of three cases. The extent of the varicose reservoir ablation is the key factor determining the hemodynamic and clinical efficacy of this more limited surgical approach. (J Vasc Surg 2009;50:107-118.)

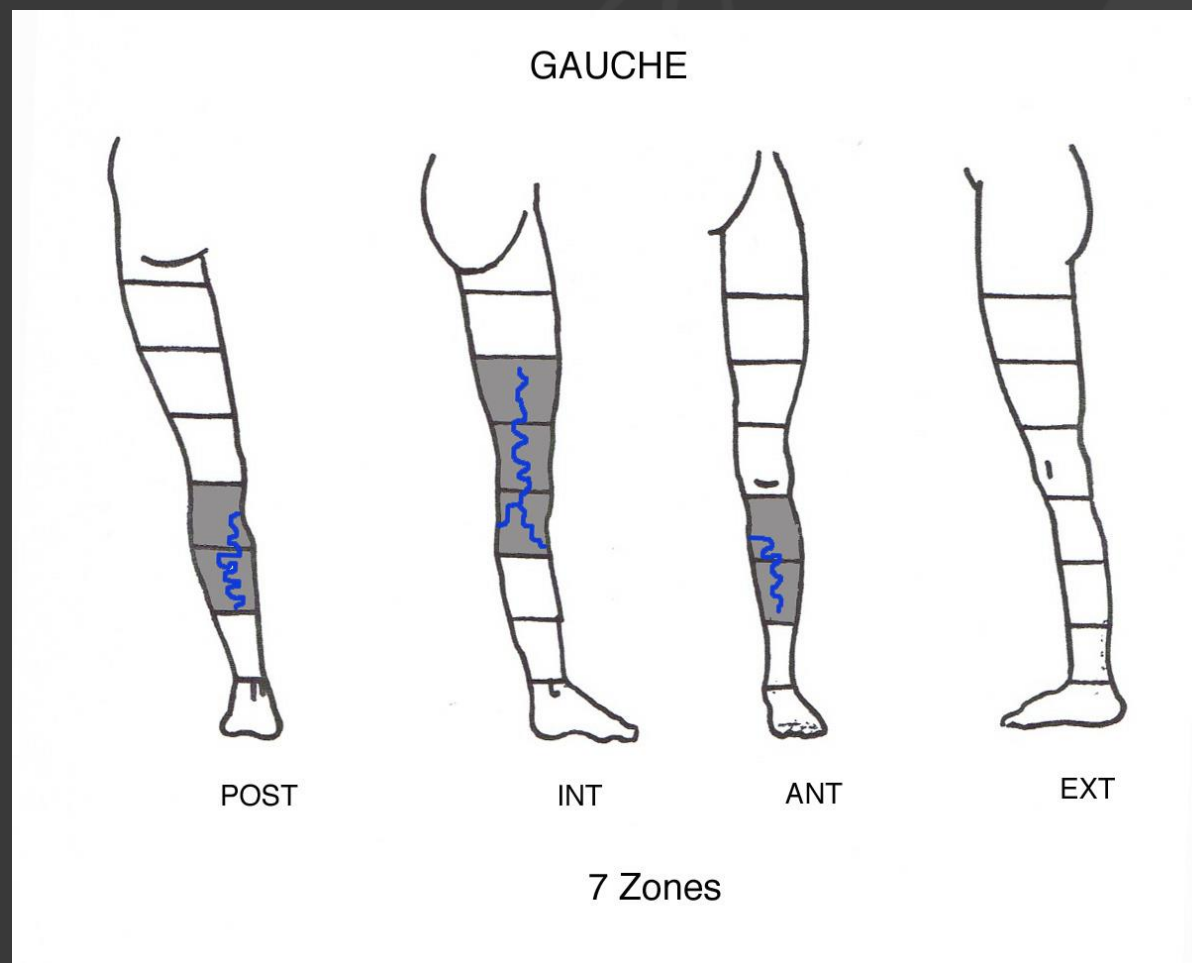
Population

Table I. Cohorts operated on by ambulatory selective varices ablation and stripping

<i>Variable^b</i>	<i>ASVAL</i>
Limbs, No.	303
Patients, No.	221
Age, y	52.7 ± 1.55 (20-83)
Female, %	75.1
BMI	23.8 ± 0.44
CEAP classification, %	
C ₀ -C ₁	0
C ₂	85.80
C ₃	5.30
C ₄	8.90
C ₅ -C ₆	0
NZT	6.05 ± 0.15
Asymptomatic limbs, %	33.7
VDS for LSBS	1.30 ± .08
Saphenous reflux, %	
GSV	88.10
SSV	11.90
GSV + SSV	0
Saphenous confluence	
Competence, %	15.80
Diameter, mm	7.05 ± 0.27
Whole SV reflux, % ^c	8.60

(J Vasc Surg 2009;50:107-18.)

Volume of varicose reservoir



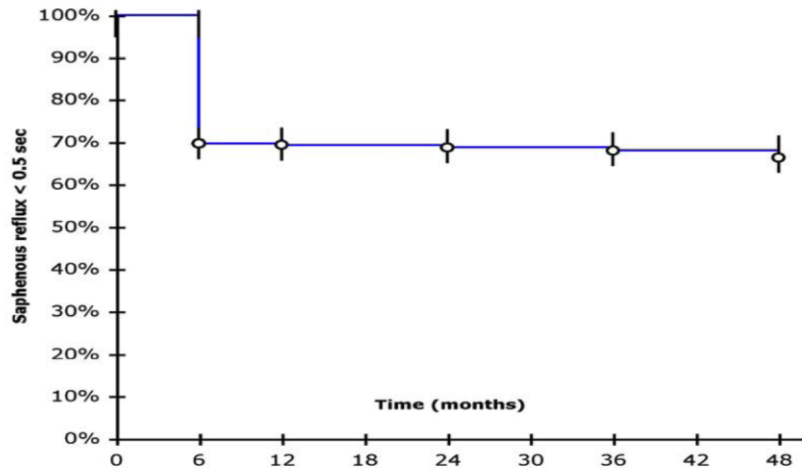
(J Vasc Surg 2009;50:107-18.)

Surgical procedures

The 303 lower limbs were treated by ASVAL over the course of 288 operations. All operations were on an outpatient basis. The mean duration was 51.80 ± 1.77 minutes (range, 20-90 minutes), and the mean number of incisions was 31.10 ± 1.33 (range, 15-77). Tumescence local anesthesia was used for all operations.

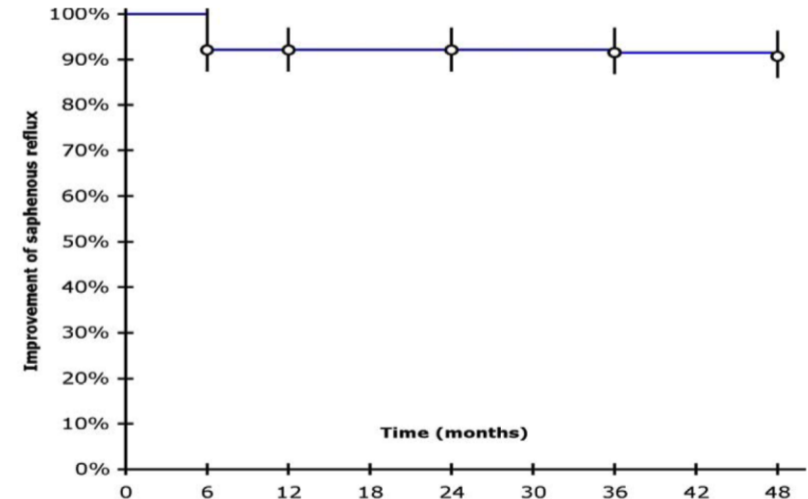
(J Vasc Surg 2009;50:107-18.)

Hemodynamic evolution after ASVAL



Hemodynamic improvement 90%
(Reduction >50 % reflux duration)

Complete abolition of reflux 70%

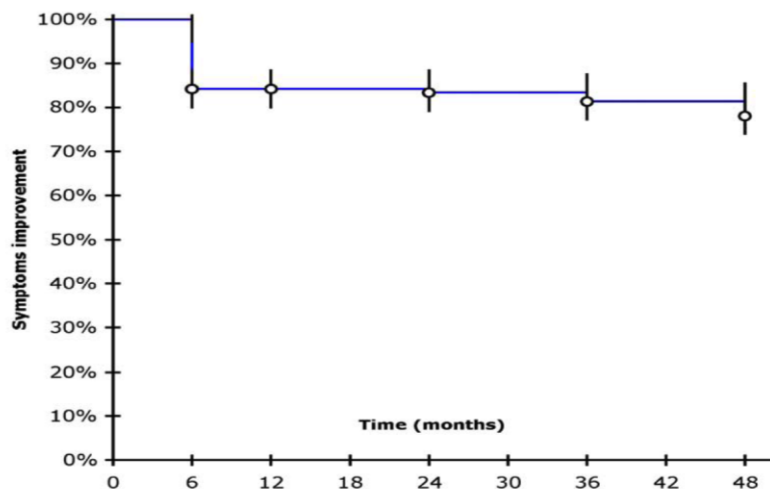


Anatomic evolution after ASVAL

Table II. Evolution of the diameter of the saphenous confluence after ambulatory selective varices ablation under local anesthesia^a

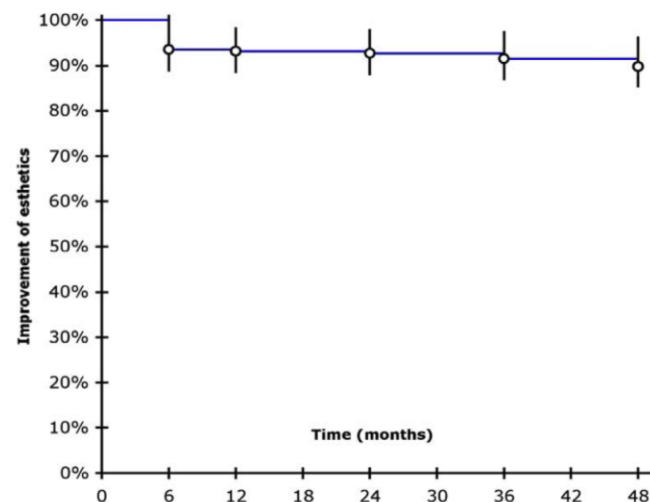
<i>Variable</i>	<i>No.</i>	<i>Mean SC diameter, mm</i>		<i>Reduction, %</i>	<i>P</i>
		<i>Pre-op</i>	<i>Post-op (6-mon)</i>		
Whole cohort controlled	243	7.87 ± 0.25	5.87 ± 0.23	25	<.0001
Unchanged SR ^b	19	9.56 ± 1.10	8.26 ± 1.13	13.5	<.0001
Considerably reduced SR ^c	63	6.56 ± 0.39	5.06 ± 0.33	22.7	<.0001
Reflux duration <0.5 s	161	8.18 ± 0.23	5.64 ± 0.23	31.7	<.0001

Clinical evolution after ASVAL

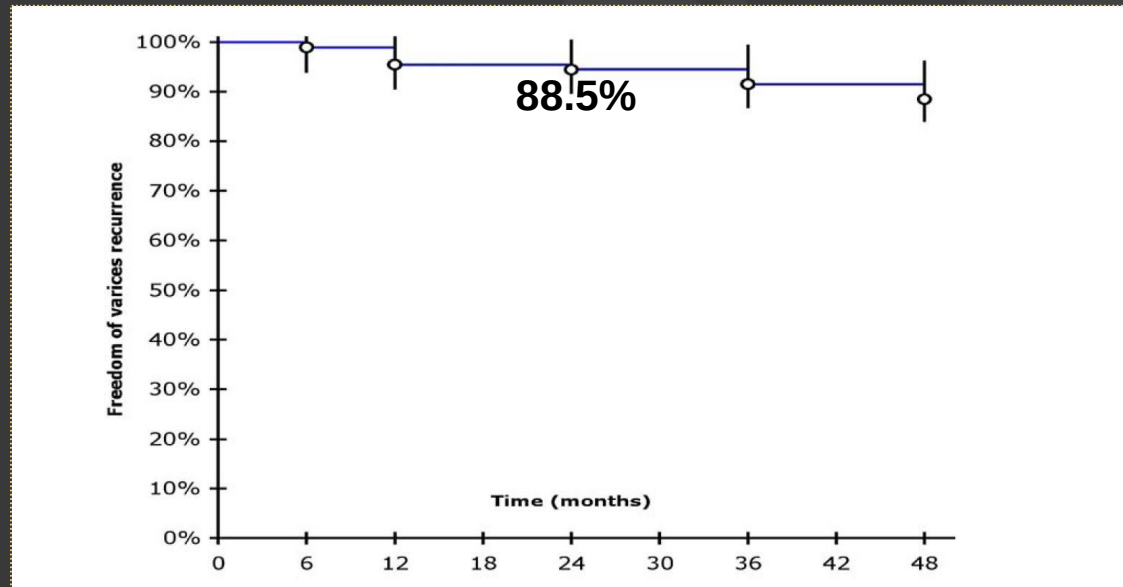


Symptoms relief 80%

Cosmetic improvement 90%



Varicose vein recurrence after ASVAL



It is highly noteworthy that for our cohort the **recurrences** were accompanied by an **absence of saphenous reflux in 17 of 24** cases, and that the reflux was unchanged compared with the preoperative situation in only three limbs.

Conclusion: Ablation of the varicose reservoir with conservation of a refluxing SV can be an effective treatment in the midterm for the signs and symptoms of SVI and leads to nonsignificant SV reflux in more than two of three cases. The extent of the varicose reservoir ablation is the key factor determining the hemodynamic and clinical efficacy of this more limited surgical approach. (J Vasc Surg 2009;50:107-18.)

Table IV. Linear trend between number of treated zones and nonsignificant saphenous reflux (reflux duration <0.5 seconds) after stratification of variable (extended Mantel-Haenszel χ^2 test)^a

NZT	Exposure level	Cases	Control	Total	Odds of exp	OR
≤4	0	17	33	50	0.02	1
5	1	20	27	47	0	0
6	2	16	50	66	.2	9.82
7	3	28	39	67	.08	3.97
>7	4	6	44	50	.14	6.82
	Total	87	193	280		

Table V. Linear trend between number of zones treated and symptoms relief after stratification of variable (extended Mantel-Haenszel χ^2 test)^a

NZT	Exposure level	Cases	Control	Total	Odds of exp	OR
≤4	0	42	8	50	5.38	1
5	1	28	19	47	1.47	.27
6	2	60	6	66	8.57	1.59
7	3	60	7	67	7.5	1.4
>7	4	47	3	50	15.67	2.91
	Total	237	43	280		

Table VI. Significant linear trend between number of zones to be treated per limb and varices recurrence after stratification of variable (extended Mantel-Haenszel χ^2 test)^a

NZT	Exposure level	Cases	Control	Total	Odds of exp	OR
≤4	0	33	17	50	1.83	1
5	1	27	20	47	1.35	.74
6	2	50	16	66	3.19	1.74
7	3	57	10	67	5.18	2.83
>7	4	44	6	50	7.33	4
	Total	211	69	280		

Influence of volume and location of varices on recurrences

ASVAL



Influence of the Location and the Volume of Varicose Vein on Recurrence after Phlebectomy with Preservation of Refluxing Great Saphenous Vein
Pittaluga P
Riviera Vein Institute, Cagnes sur Mer, France

During the period studied we operated on a total of 1212 LLs ($C0-C1=0\%$; $C2=85.5\%$; $C3=5.2\%$; $C4-C6=9.2\%$) by isolated phlebectomy with preservation of a refluxing GSV, in 816 patients (611 women and 205 men) aged between 19 and 93 (mean age 56.1). We have reviewed 1010 LLs in 680 patients with a mean follow-up of 36.6 months (12 to 76 months; median 36.0 months).

Influence of volume and location of varices on recurrences

ASVAL



	REVAS	No REVAS	P
Nb limbs	90	920	
<u>Preop GSV reflux location</u>			
Ostial	47.8%	47.3%	NS
Above Knee (AK)	16.7%	32.1%	<.05
AK + Below Knee	66.7%	55.3%	<.05
Whole GSV	13.3%	7.6%	<.05

Less freq. REVAS when (preop) reflux was located above knee

Influence of volume and location of varices on recurrences

ASVAL



Influence of the Location and the Volume of Varicose Vein on Recurrence after
Phlebectomy with Preservation of Refluxing Great Saphenous Vein
Pittaluga P
Riviera Vein Institute, Cagnes sur Mer, France

	REVAS	No REVAS	P
Nb limbs	90	920	
<u>Preop origin of varices</u>			
Thigh	2.2%	19.9%	<.05
Thigh + calf	27.8%	26.1%	NS
Upper calf	20.0%	34.5%	<.05
Whole calf	46.7%	12.8%	<.05

Less freq. REVAS when (preop) varices at the thigh or upper calf

Biemans AA JVS VL 2014

The effect of single phlebectomies of a large varicose tributary on great saphenous vein reflux

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Objective: Phlebectomy of varicose tributaries is usually considered an additional treatment after or during saphenous ablation. As phlebectomies alone affect the hemodynamics of the venous system, this treatment can be effective as primary intervention in selected patients. The objective of this study was to analyze hemodynamic, clinical, and patient-reported outcomes after phlebectomies in a prospective multicenter study to determine predictors for treatment success, that is, restoration of great saphenous vein (GSV) competence.

Methods: Patients with symptomatic GSV and tributary incompetence (reflux > 0.5 second) at the level of the thigh were included. Duplex ultrasound (DUS) was used to assess GSV and tributary characteristics, and a reflux elimination test was performed. Three and 12 months after phlebectomy of the tributary, reflux and GSV diameter were evaluated with DUS. Clinical outcome measures were C class of the Clinical, Etiologic, Anatomic, and Pathologic (CEAP) classification and Venous Clinical Severity Score; patients' reported outcome was determined by the Aberdeen Varicose Vein Questionnaire. To evaluate differences between the success and failure groups, baseline DUS characteristics, Venous Clinical Severity Score, CEAP class, and Aberdeen Varicose Vein Questionnaire score were compared. Multivariable logistic regression including all clinically relevant variables

following a backward variable elimination process was used to determine predictors for success. The model was internally validated by 1000 bootstrap samples.

Results: The study included 94 patients (65 women, 29 men) with a mean age of 53 years. The majority had C2 or C3 disease. One year after treatment, GSV reflux had disappeared in 50% of patients ($P < .01$), and GSV diameter had decreased significantly ($P < .01$). Clinical outcome and Aberdeen Varicose Vein Questionnaire score improved significantly ($P < .01$) and symptoms had disappeared in 66%. Of 47 patients with persisting GSV incompetence, 15 did not receive additional treatment because they were asymptomatic. Independent predictors for success were low CEAP class of the CEAP classification, low number of refluxing GSV segments, small diameter of the GSV above the tributary, and positive reflux elimination test result ($P < .0001$). The reflux elimination test appeared to be an important independent predictor, with >65% chance of success when the result was positive.

Conclusions: At 1-year follow-up, treatment with single phlebectomies of a large tributary was effective to abolish GSV reflux in 50% of patients and to free 66% of patients from symptoms. Patients with limited disease progression and mild DUS alterations are most likely to benefit from this approach. (J Vasc Surg: Venous and Lym Dis 2014;2:179-87.)

**1 year: Abolition reflux 50%
Abolition symptoms 66%
(unselected population)**

Predictors for success:

= Less advanced stage:

- Low C class CEAP
- Low nb refluxing GSV segments
- Low diameter of the GSV

= Positive preop reflux elimination test +++

Best indications for ASVAL

■ Hemodynamic or anatomical

- Limited GSV dilatation <10 mm
- Segmental SV reflux, uniq. collat.
- Reversibility test +



■ Clinical

- Nulliparity +++
- Young age
- Cosmetic concern

The traditional descending theory for the SVI should not be longer considered as the univocal explanation

We have more and more evidences that the evolution of the SVI processes mostly from the supra-fascial network in an ascending or multifocal fashion.

Consequently, a treatment limited to the varicose tributaries (ASVAL) can improve the symptoms and hemodynamics, preserve the venous drainage and prevent a further deterioration.



THANK YOU