

## Thermal expansion and shrinking of the great saphenous vein ( GSV ) using the EndoVenous Radio Frequency ( EVRF ®) and monitoring using the endoscopic video-assisted Crossclipping ( EVCC ) and the open crossotomy .

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### Case study

The application of radiofrequency as endovenous ablation therapy of the GSV has meanwhile established itself as a method for minimal invasive treatment of venous insufficiencies. Since the insufficient saphenofemoral junction is not also treated in the process, we wanted to investigate how extensive the heat generation of the probe tip is and whether there is a possibility to also treat those insufficient veins endoveneously without damaging the femoral vein.

#### Method

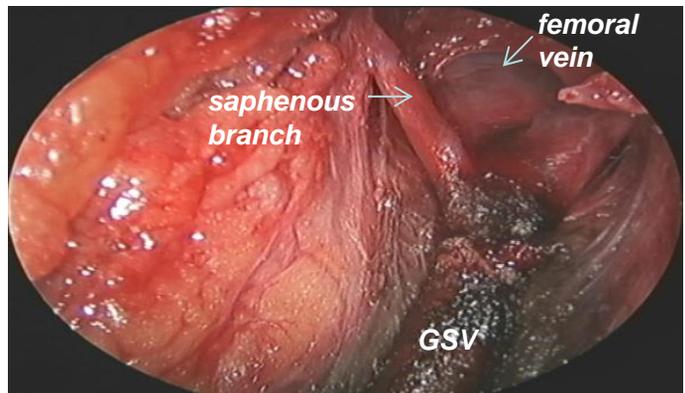
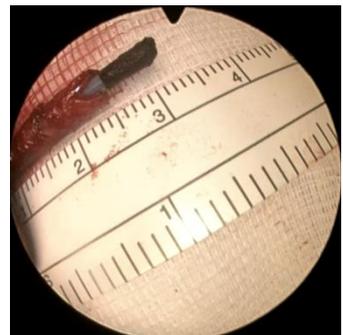
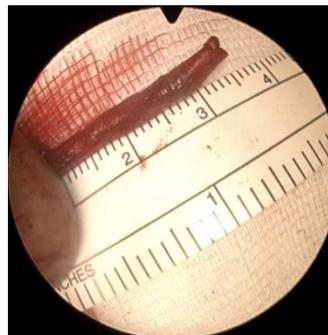
On six patients we have performed an endovenous treatment of the GSV using **EVRF®** (EndoVenousRadioFrequency, Fcare systems). The probe used (CR 45i ) has an uninsulated tip of 5 mm. With 3 patients, we have also carried out an open crossotomy and partial resection of the proximal GSV which we ablated ex vivo. Three patients underwent an endoscopic video-assisted Crossclipping ( **EVCC** ).

#### Results

All GSV and Cross were sufficiently deactivated. The application of the probe performed ex vivo showed both proximal and distal ablation of up to 10 mm in each direction from the probe tip with a clear longitudinal shrinkage. The patients who underwent endoscopic video-assisted clipping ( **EVCC** ), in contrast, only had a proximal and distal ablation of the GSV from the probe tip to a maximum of 3 mm. Therefore, an extensive longitudinal shrinkage could not be verified.

#### Conclusion

The placement of the probe (CR 45i) in the proximal GSV without a safety distance of 2 cm to the vein, is permissible in some circumstances, because in vivo, low thermal expansion of the probe tip to the proximal end, will most probably not damage the femoral vein. This effect would have the concomitant elimination of the insufficient saphenofemoral junction by thermal ablation. The ex vivo longitudinal shrinkage of the vein shows the non-localized limitation of energy at the probe tip, of which the dispersion is probably supported by the absence of the perivascular tissue support.



### Summary:

It is proved that the expansion of the thermal energy when using the EVRF® probe is not limited to the probe tip. This should be considered when placing it in the saphenofemoral junction and to avoid damaging the femoral vein. Under endoscopic control or applying open vein treatment the probe can be placed more precisely in the area of insufficient saphenofemoral junction, without expecting to damage the femoral vein, since the ablation is controlled visually.