### Study Design Analysis Results

**Study:**
- **Design:** Meta-analysis.
- **Aim:** To evaluate the performance of plethysmography and rheography in the diagnosis of DVT.
- **Primary outcome:** Sensitivity and specificity of plethysmography and rheography in the diagnosis of DVT.
- **Literature search date:** 1996-2004.

**Inclusion:**
- Diagnostic cohort studies that compared plethysmography or rheography to a reference standard test for DVT (contrast venography or ultrasound) in patients with clinically suspected DVT.

**Exclusion:**
- Case-control studies, studies including <10 patients, studies of patients with suspected pulmonary embolism and studies published in languages other than English, French, Spanish, or Italian.

**Evaluation of study quality:**
- Yes.

**Publication Bias:**
- Not examined.

**Number of studies meeting inclusion criteria:**
- N=78 studies, reporting on 82 patient cohorts.

**Data extracted by 2 or more reviewers?**
- Yes.

**Tested for homogeneity:**
- Yes.

**Analysis method:**
- Random effects model.

**Validity /Conclusions**
- The meta-analysis included 78 studies reporting on 82 patient cohorts.
- N=42 evaluated impedance plethysmography, 20 strain-gauge plethysmography, 9 on light reflex rheography, 7 on phlebography, and 4 on air plethysmography.
- Plethysmography and rheography were compared to venography in 75 cohorts and to ultrasound in 7 cohorts.

Sensitivity and specificity of plethysmography and rheography techniques used to diagnose DVT using venograms or ultrasound as a gold standard:

<table>
<thead>
<tr>
<th>Technique</th>
<th>N* of cohort</th>
<th>Sensitivity All DVTs (95% CI)</th>
<th>Sensitivity proximal DVTs (95% CI)</th>
<th>Sensitivity distal DVTs (95% CI)</th>
<th>Specificity All DVTs (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance plethysmography</td>
<td>42 (28)</td>
<td>75% (73-77%)</td>
<td>88% (86-90%)</td>
<td>28% (24-33%)</td>
<td>90% (89-91%)</td>
</tr>
<tr>
<td>Strain gauge plethysmography</td>
<td>20 (10)</td>
<td>83% (81-85%)</td>
<td>90% (88-92%)</td>
<td>56% (50-63%)</td>
<td>81% (79-82%)</td>
</tr>
<tr>
<td>Air plethysmography</td>
<td>4 (2)</td>
<td>85% (79-90%)</td>
<td>98% (93-100%)</td>
<td>39% (22-58%)</td>
<td>91% (81-95%)</td>
</tr>
<tr>
<td>Light reflex plethysmography</td>
<td>9 (4)</td>
<td>91% (87-94%)</td>
<td>94% (88-98%)</td>
<td>92% (74-99%)</td>
<td>71% (66-75%)</td>
</tr>
<tr>
<td>Phlebography</td>
<td>7 (4)</td>
<td>86% (83-89%)</td>
<td>92% (88-94%)</td>
<td>58% (48-68%)</td>
<td>93% (91-95%)</td>
</tr>
</tbody>
</table>

*Number between parenthesis is the number of cohorts that reported on proximal and distal DVTs separately.

There was significant heterogeneity among the results of the studies for the majority of techniques especially for those that included larger number of studies.

Meta-regression showed that specificity was lower in cohorts with a higher prevalence of DVT and cohorts with higher proportion of male patients.

Studies with better reporting had lower sensitivity and higher specificity.

**Advantages/limitations:**
- The meta-analysis had defined inclusion/exclusion criteria and valid analysis. However, a meta-analysis is as good as the studies it included. The authors indicated that they used quality indicators to assess the methodology of the studies but did not provide any quantitative data, and due to the poor recording of the trials they were unable to evaluate the quality of many of the studies. In addition, there was significant heterogeneity between the studies. There were differences in inclusion criteria, equipment used, methodology, and interpretation within each technique studied.

**Conclusion:**
- The authors concluded that the results of the meta-analysis suggest that none of the techniques has sufficient sensitivity or specificity to be used as a stand alone test to diagnose or rule out DVT.