

Aufgabenbeschreibung

Studienarbeit/Masterarbeit – Starting ASAP (Latest end of July)

Prevention of venous collapse during blood draw

Improving Blood Draw Methods – MIT, Boston, USA Collaboration

During blood draw, especially in new born babies and the elderly, a patient's venous walls can collapse. This results in effective blood draw being no longer possible and potentially damaged blood samples. Consequently, clinicians are required to draw blood at another location, requiring more time and increasing patient discomfort. Therefore, this project is focused on preventing venous wall collapse through the use of an indicator or safety mechanism. The device should be designed to be integrated into existing blood draw equipment and able to be disposed of after use. The final prototype will be evaluated by drawing fluid from a collapsible vein inside of a silicon phantom.

The main points to be addressed are:

- Review of current literature around elderly and neonatal blood draw, identifying a thresholds of venous collapse.
- Creation of a FE model to simulate a collapse within the vein, identifying characteristic pressure and flow rates.
- Further development of an existing mathematical model describing the restricted blood flow dynamics.
- Concept design and build of a venous collapse prevention device.
- Modification of current test rig to evaluate static pressure within the vessel when using and not using the designed device.
- Evaluation of the device functionality compared to standard blood draw equipment.

Supervision will be provided in English by a native English speaker (From New Zealand). As a result, the thesis should also be written in English. Note, as this project is part of a larger project with MIT there is the potential for the student to also fly to MIT, Boston.



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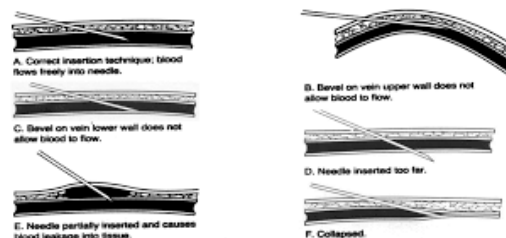


Figure 10-6 Proper and improper needle positioning. A. Proper needle position. B. Needle bevel against the upper wall of a vein. C. Needle bevel against or embedded in opposite wall of vein. D. Needle inserted all the way through a vein. E. Needle partially inserted into vein. F. Needle in collapsed vein.

Venepuncture exercises 2018



<http://news.mit.edu>

If interested, please send your CV (English) and academic transcript to:

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