

Tissue Engineering (TE)

A. Rosales

Karavdeling, OUS

Definisjon TE

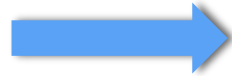
Bruk av celler, spesielle materialer, og egnede biokjemiske faktorer for å forbedre eller erstatte biologiske funksjoner



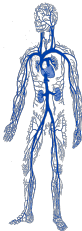
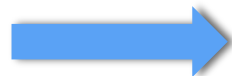
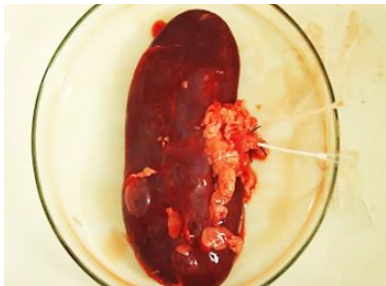
Vevsskjelett "scaffold"

- Syntetisk nedbrytbar struktur
- Naturlig allogene og xenogene

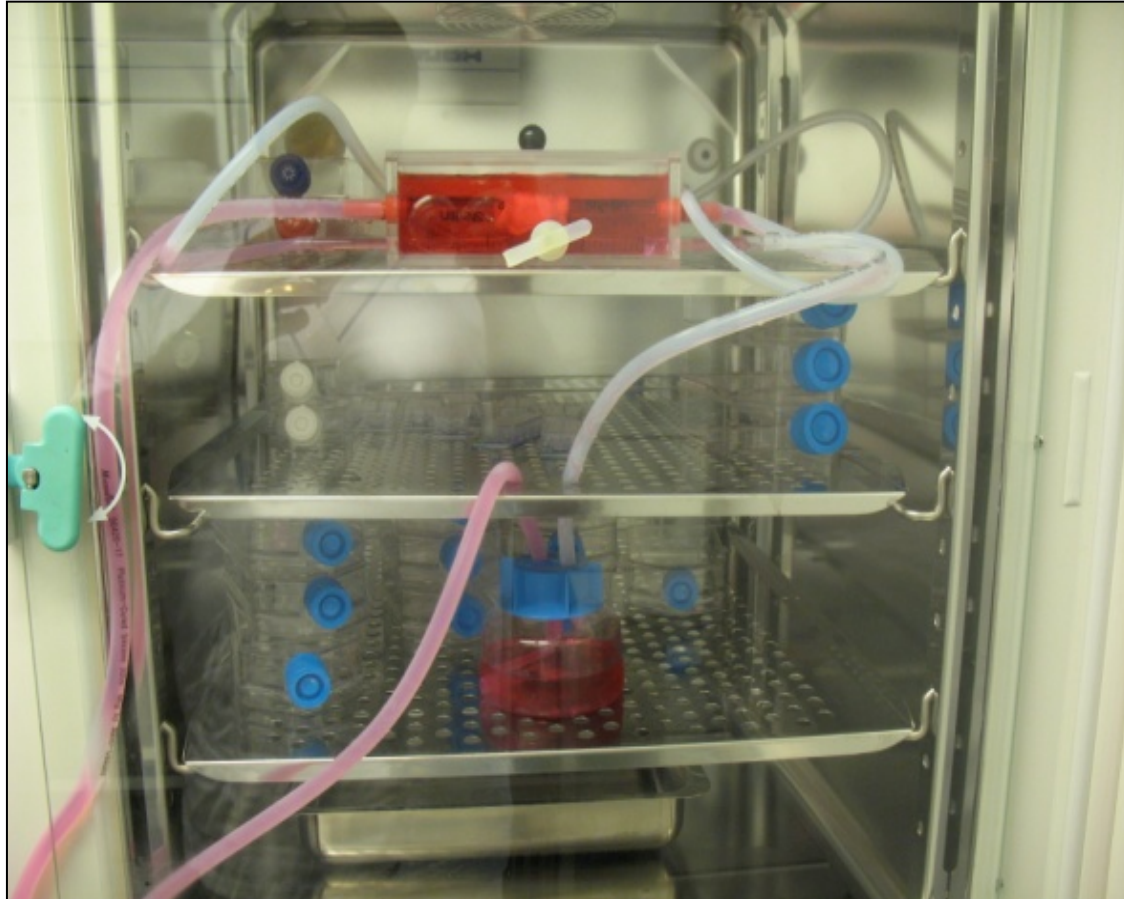
Decellularisering: Fjerne alle levende celler fra et organ



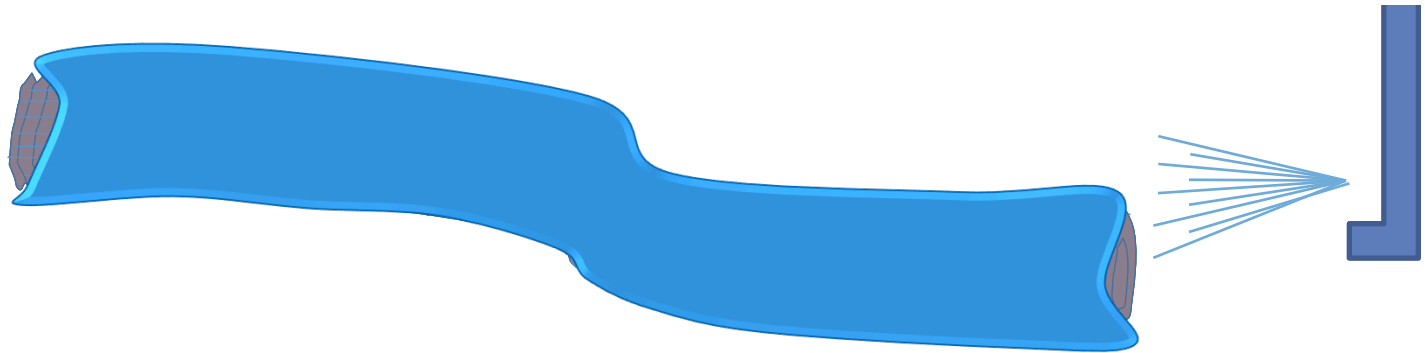
Vevsskjelett
"scaffold"



Bioreaktor



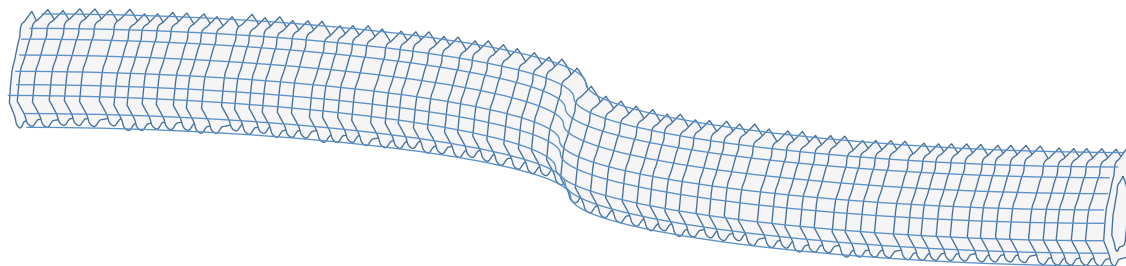
PBS (buffer)
with Antibiotic



1. Fjerning av røde blodlegeme
2. Fjerning av celler i (3 lag)
3. Fjerning av DNA
4. Oppbevaring av "scaffold" sterilt-kaldt

Recellularisering

- Cellularisering av vevssjelett (scaffold)

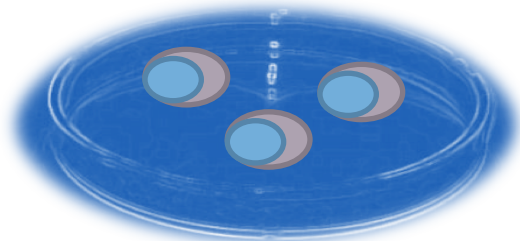


Gjensåing - Recellularisation

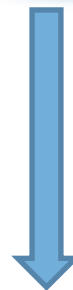
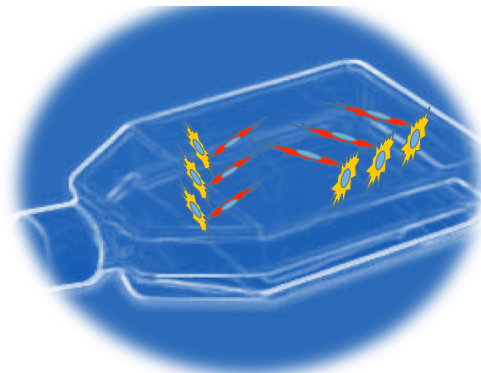
- Beinmarg
- Navle streng blod
- Morkaka
- Fett
- Blood

Redesigning scaffold *in vitro*

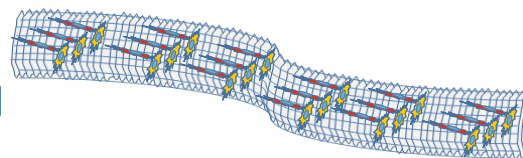
Stem cells from recipient



Growth



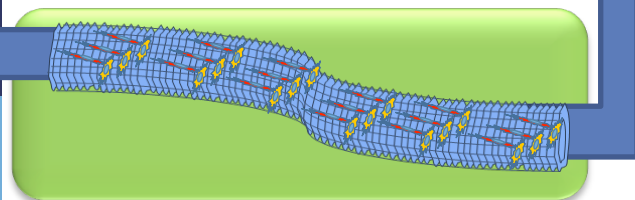
Seeding



Peristaltic Pump

Bubble trapper

Redesigning



OUS-Sahlgrenska

Status høst 2015

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graph TD; A[Status høst 2015] --> B[Samleårer<br/>Allogene<br/>mennesker]; A --> C[Pulsårer<br/>Xenogene<br/>dyr];
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Samleårer
Allogene
mennesker

Pulsårer
Xenogene
dyr



Successful tissue engineering of competent allogeneic venous valves. J of Vasc Surg, Venous and Lymphatics. In press.

Vijay Kumar Kuna, MSc^{1}, Antonio Rosales, MD^{2*}, Jonny Hisdal, PhD², Eivind K Osnes, MD PhD², Jon O Sundhagen, MD², Henrik Bäckdahl³, Suchitra Sumitran-Holgersson, PhD¹, Jørgen J Jørgensen, MD, PhD^{2,4}*

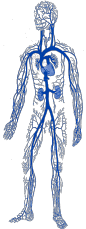
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² Department of Vascular Surgery, Oslo Vascular Centre, Oslo University Hospital, Aker. Norway.

³SP Technical Research Institute of Sweden, Dept. of Chemistry, Materials and Surfaces. Sweden.

Materials & Methods

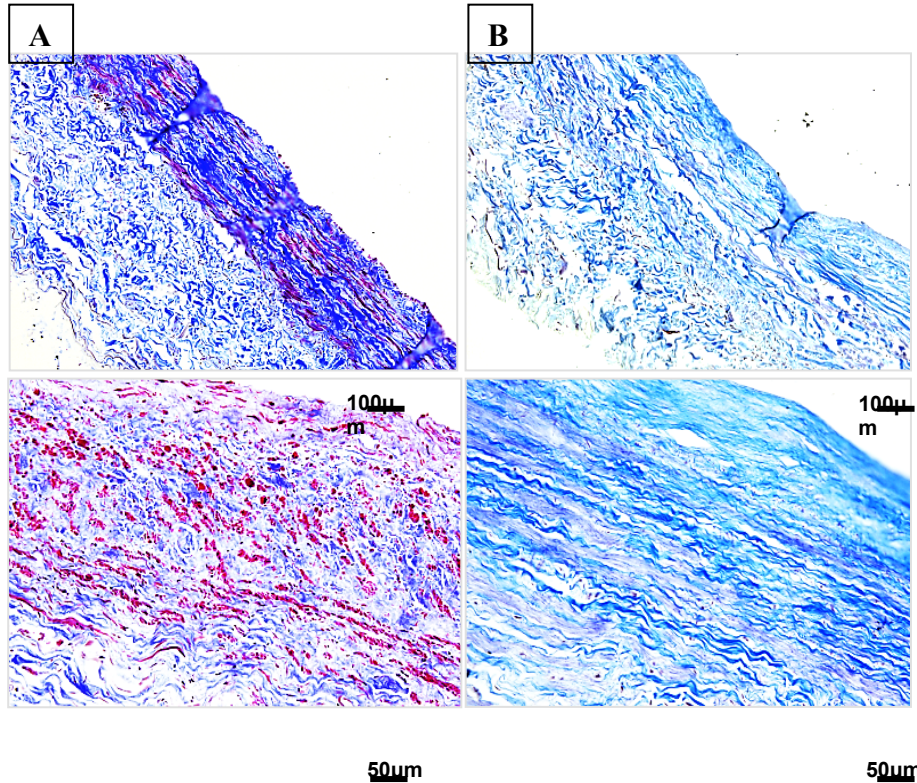
1. Femoral vein specimens harvested from cadaver
2. Valve function test in laboratory
 - Valve closure time
 - Resistance to valve pressure



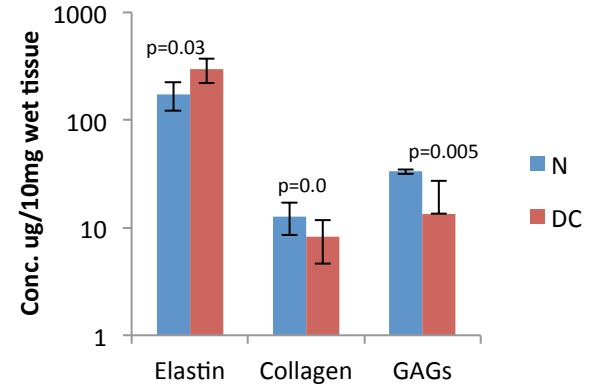
Materials & Methods

1. Femoral vein specimens harvested from cadaver
2. Valve function test in laboratory
 - Valve closure time
 - Resistance to valve pressure
3. De-cellularization
 - DNA quantifying
 - Absence of nuclei
 - Loss of collagen
4. Re-cellularization
 - Immuno- fluorescence and histochemistry showed endothelial and muscle cells
5. Valve function test in lab.

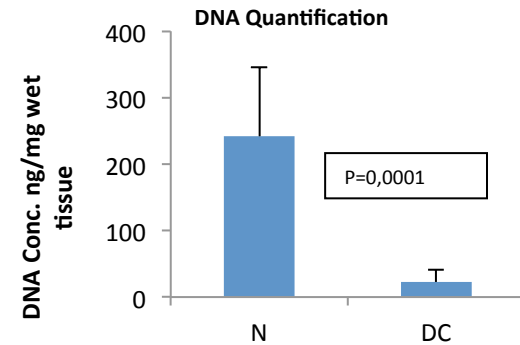
Figure 3



C

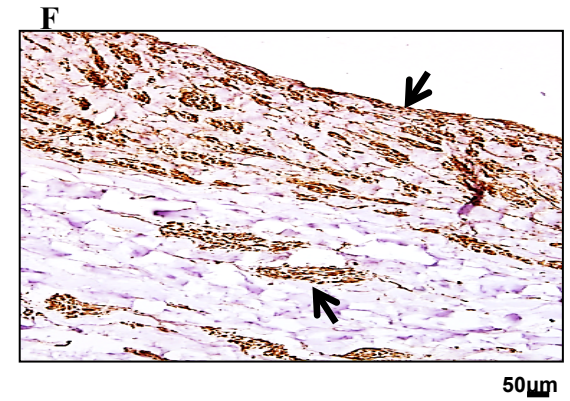
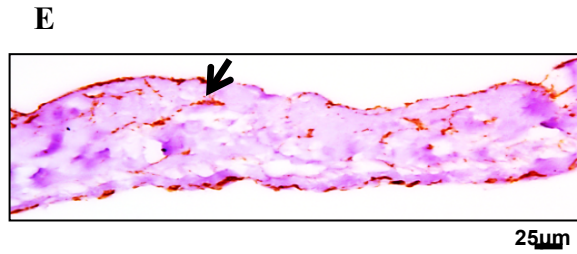
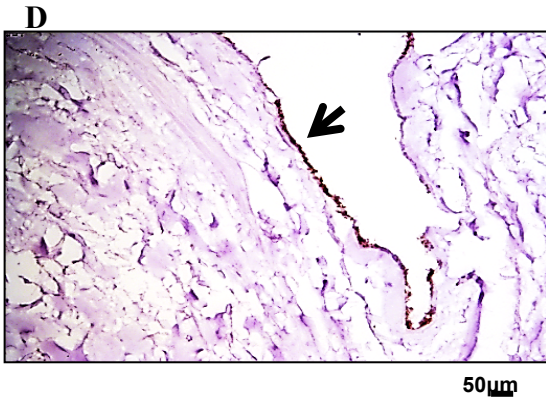


D



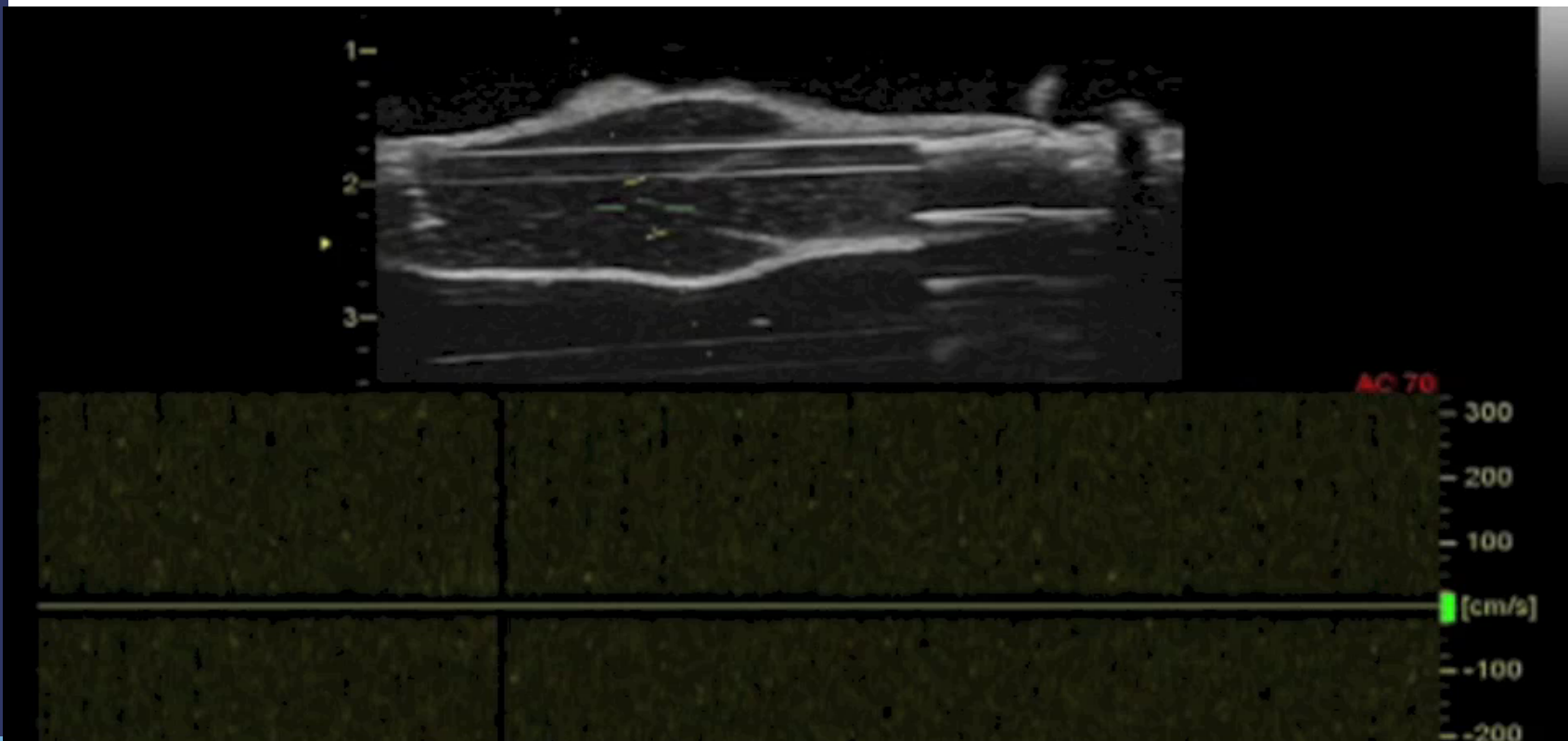
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NOVI

Nasjonal behandlingstjeneste for
rekonstruktiv dyp venekirurgi

TECVI

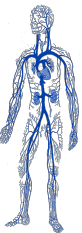
tissue engineering in chronic venous insufficiency

Klinisk pilotstudie planlagt start 1.1.2016

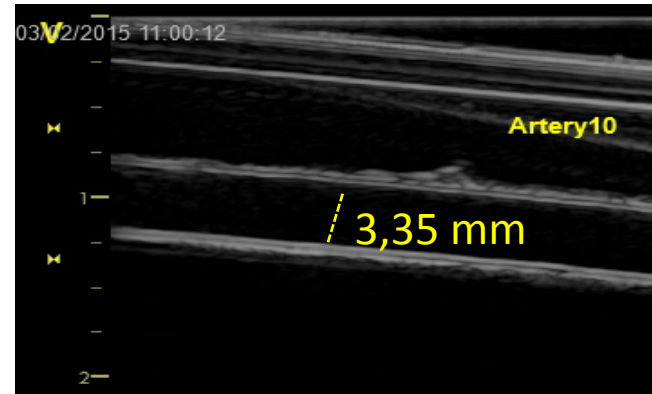
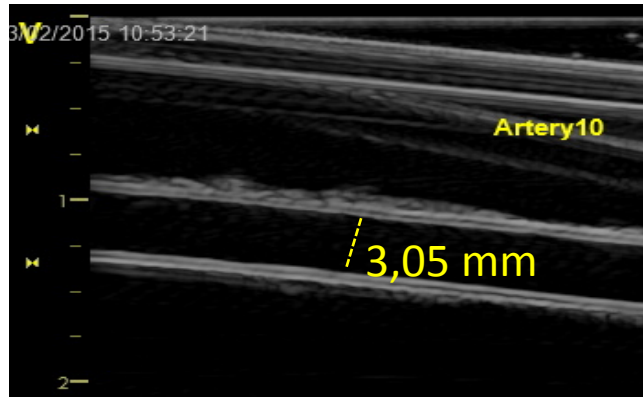
TE av arterier

In vitro testing av native, de- og recell. preparater

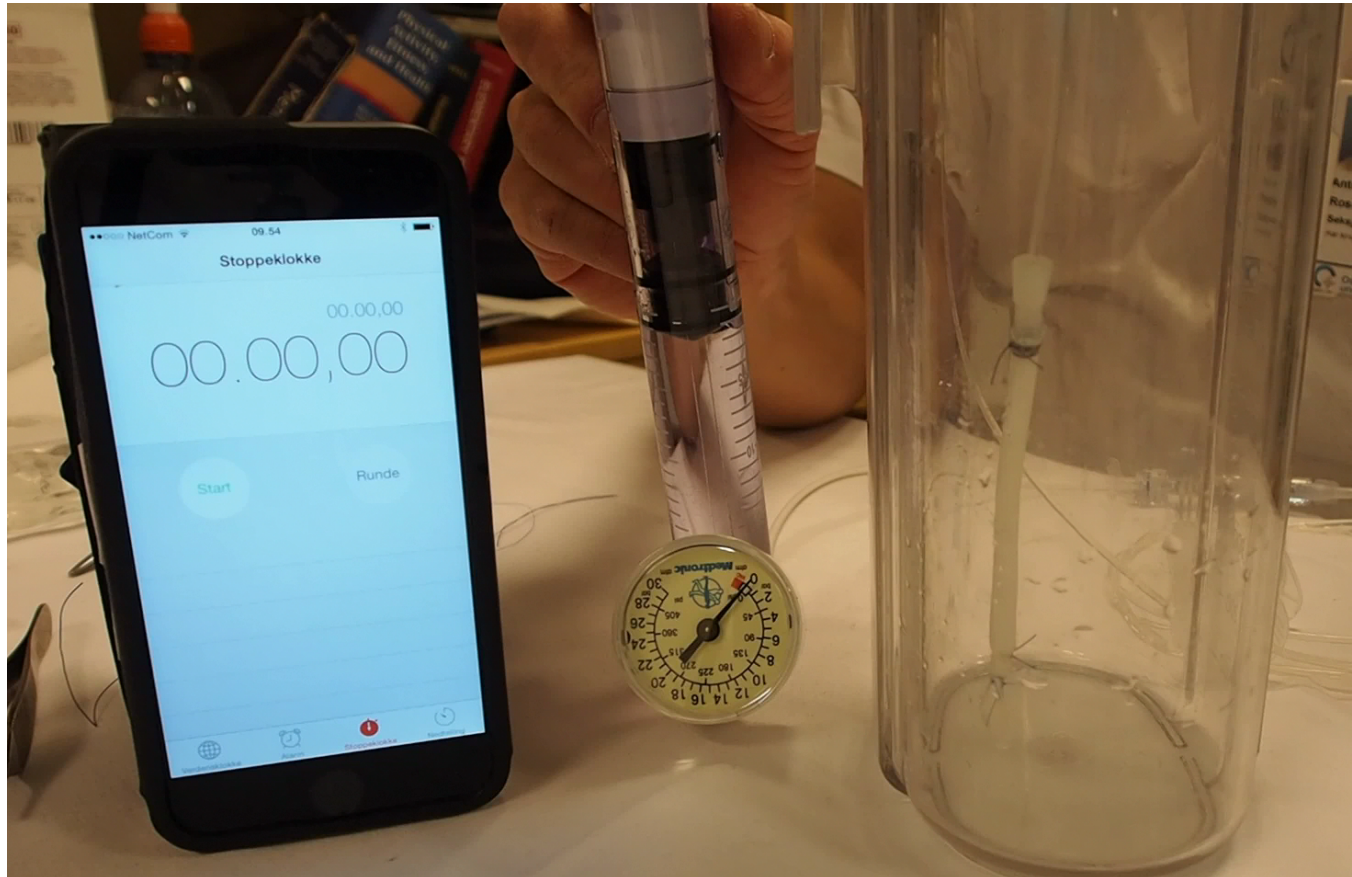
- “Compliance”
- “Burst pressure”
- Dyre forsøk



Bildet viser arterie 10 ved 60 mmHg og 220 mmHg



Burst pressure (7-14bar)



TE av arterier

- Dyreforsøk
 - Xenogene scaffolds(sau, kalv)
 - Mottaker *minigris*
 - Oppfølging 6 måneder

**OUS
KARAVDELING**

**Transplantation-
Regenerative
Medicine
Sahlgrenska**

**NMBU
ProdMed -
Eksperimentell
biomedisin**



Bruk av TE i karkirurgi

- Kronisk venøs insuffisiens
 - Vene segmenter med fungerende klaff
 - Vene segmenter til bypass
- Infisert graft behandling
- Revaskularisering i underkstremiteter ved manglende vene
- A-V fistel anleggelse

