



CONGRESSO DE CIRURGIA ESPINHAL

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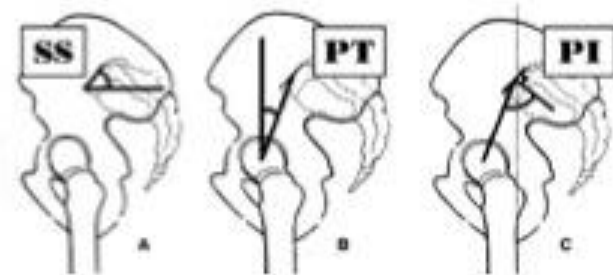
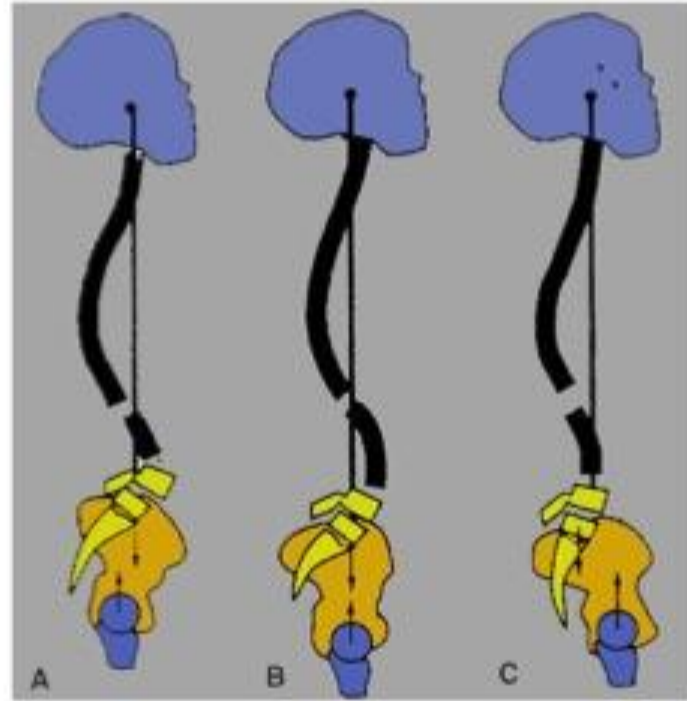
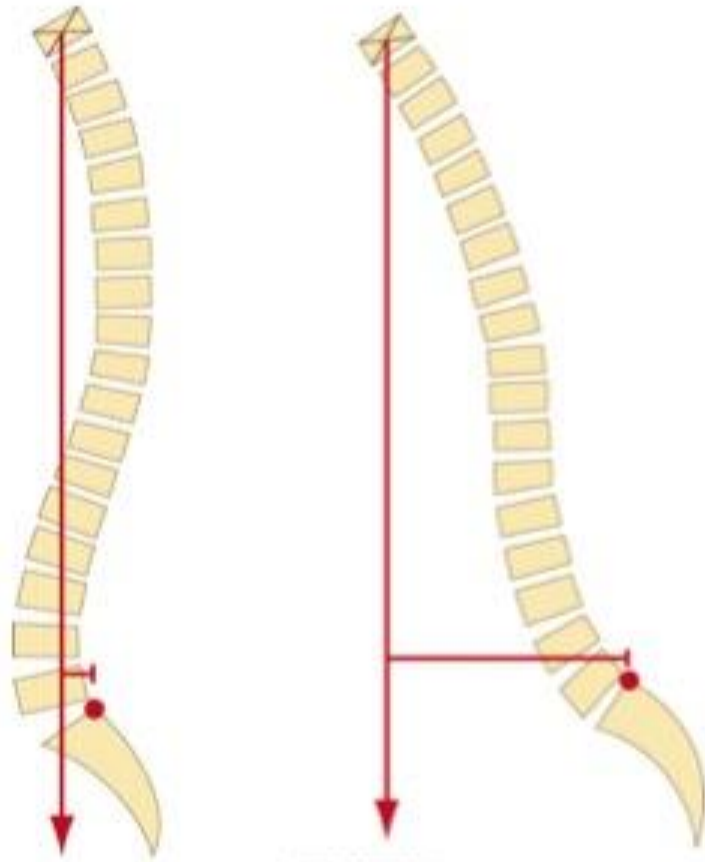
Princípios Biomecânicos da Fixação Toracolombar

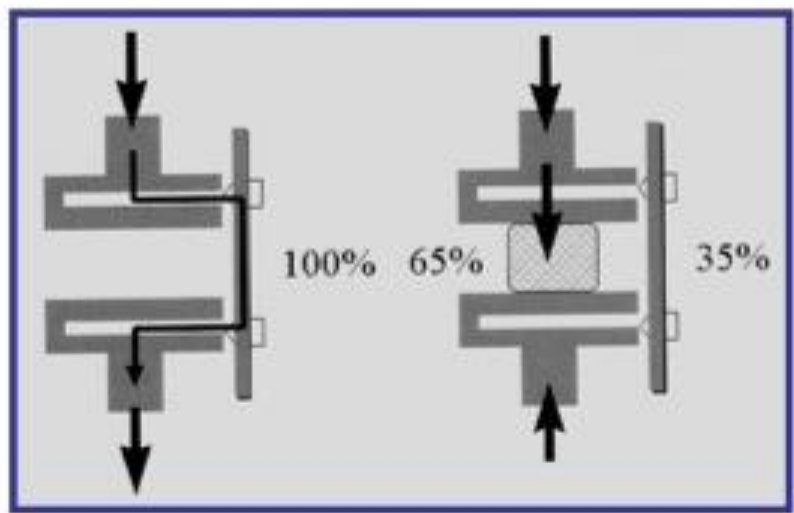
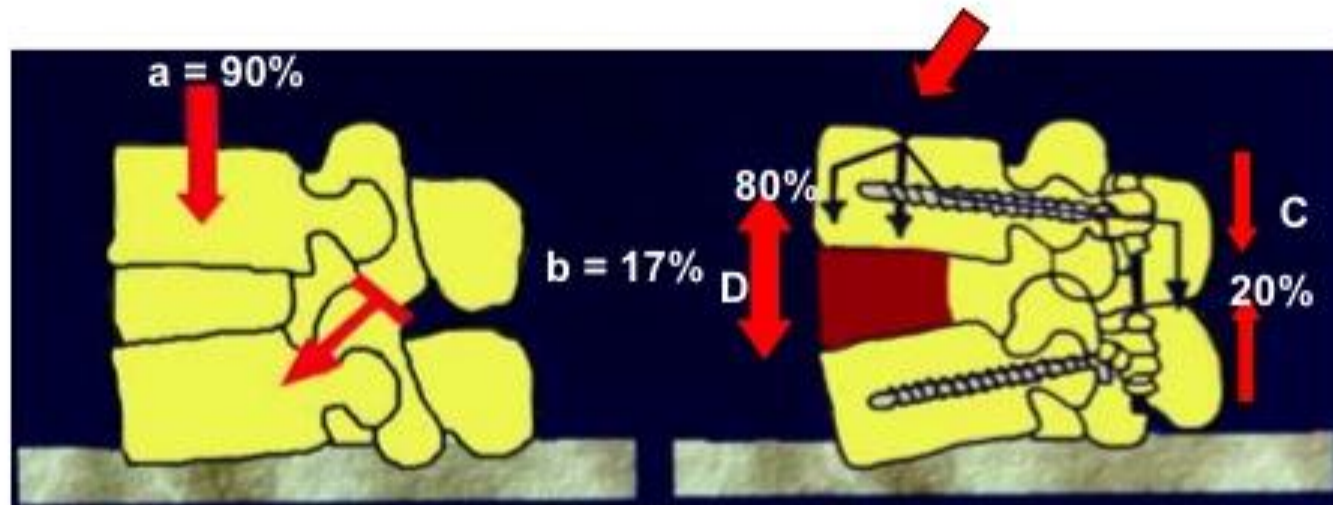
Helton Defino

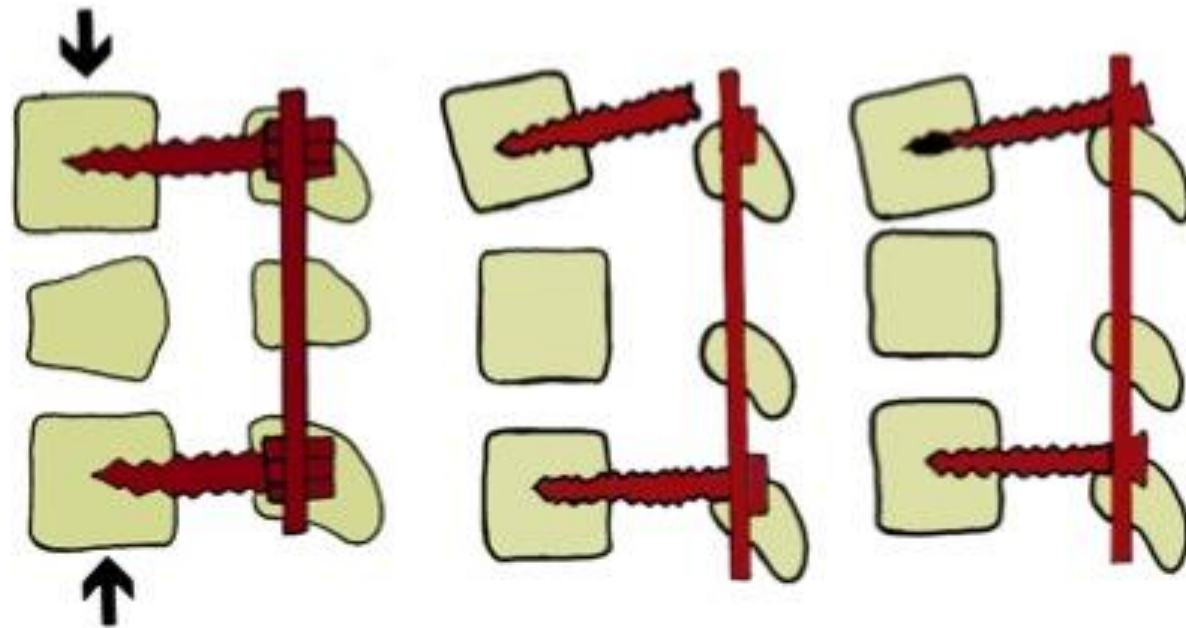
Faculdade de Medicina de Ribeirão Preto

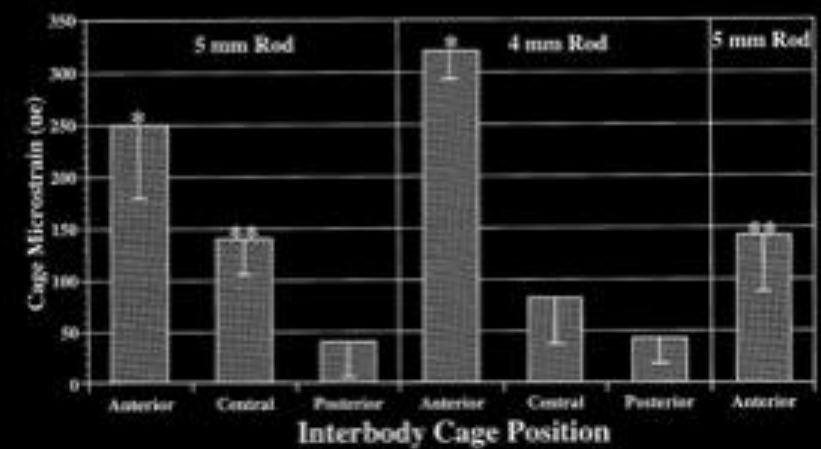
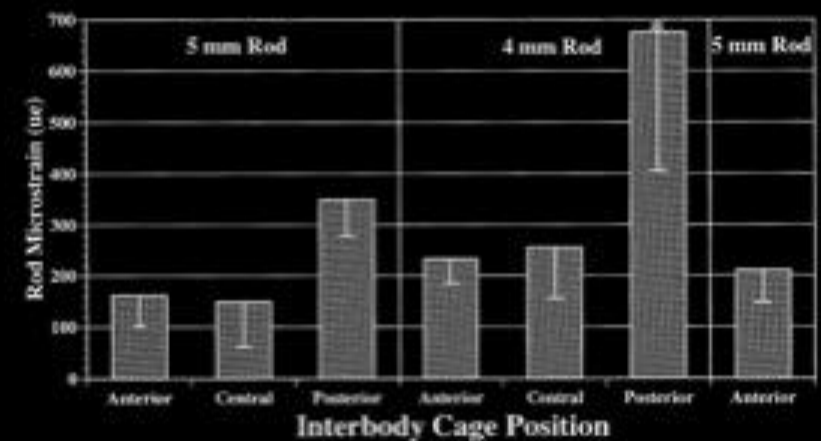
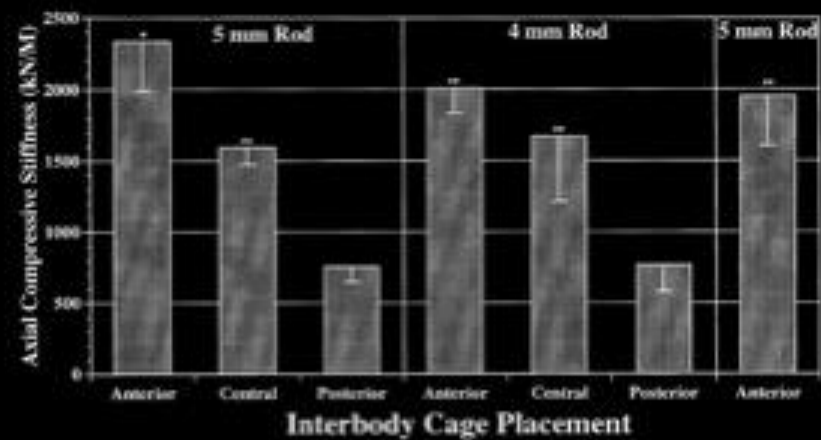
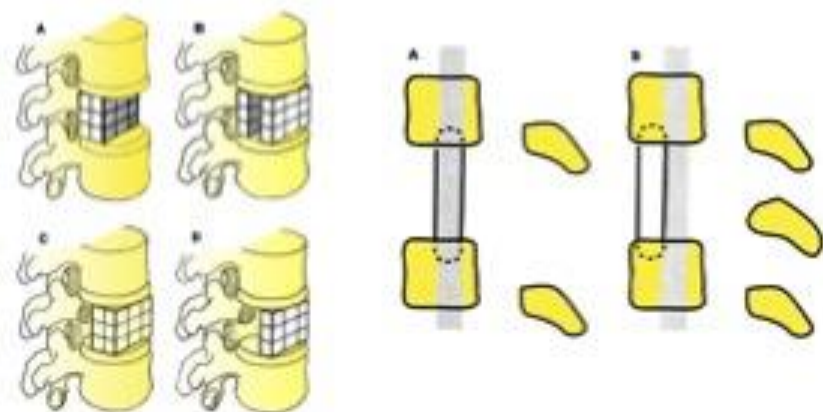
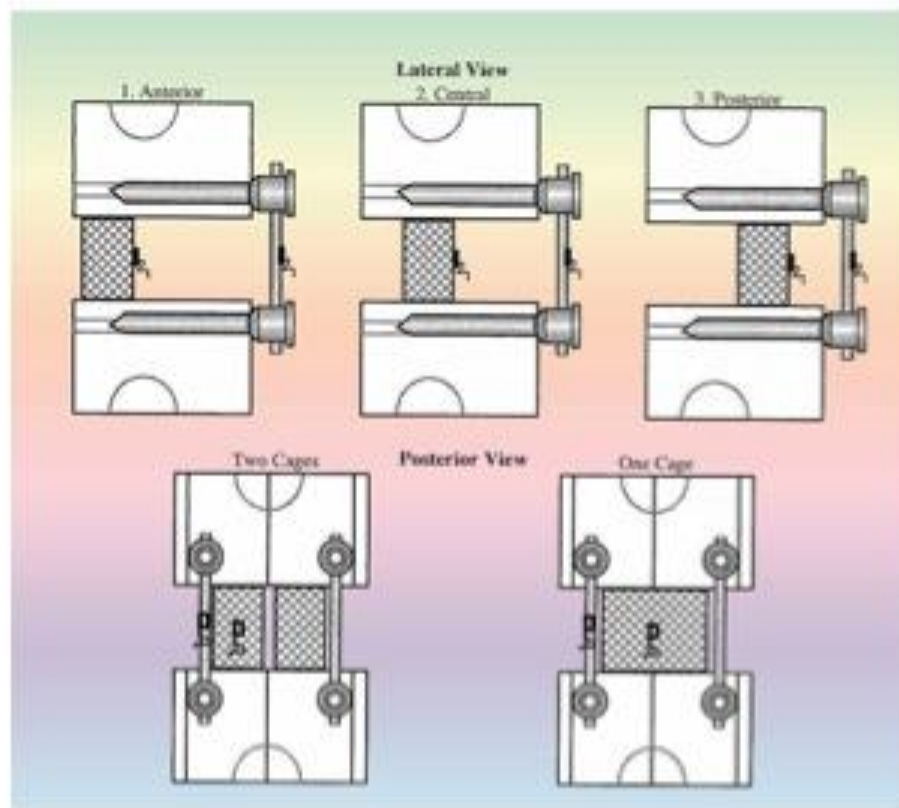
Universidade de São Paulo

Equilíbrio Sagital









B

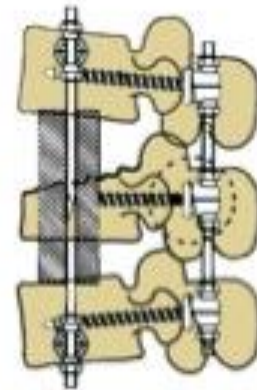
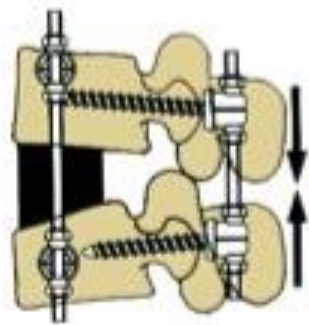
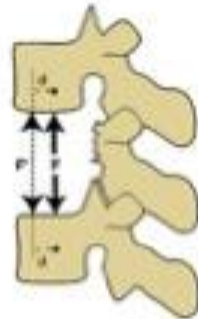
C

D



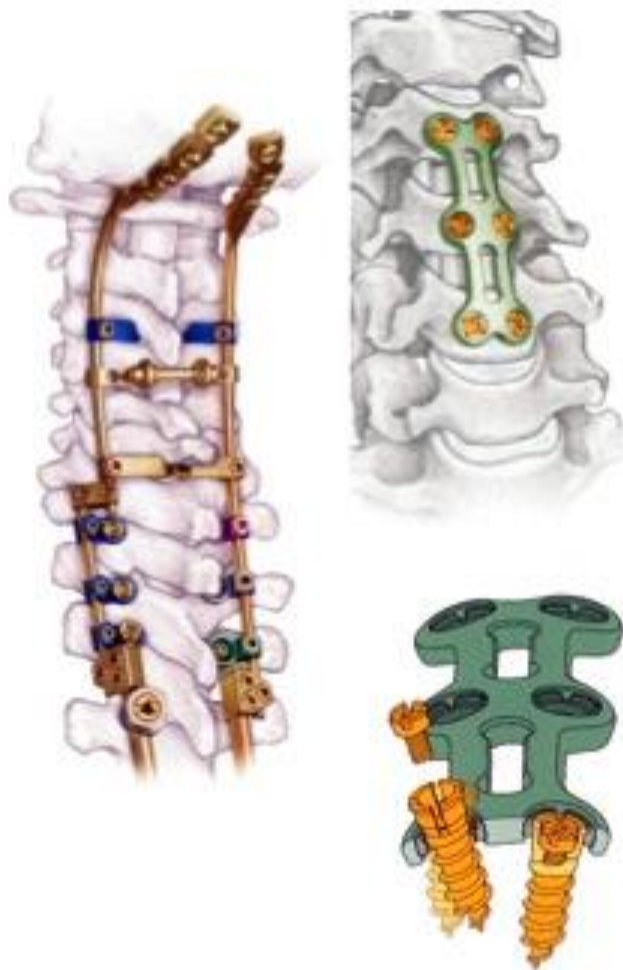


Jürgen Harms



Sistemas de Fixação Vertebral (Componentes)

- **Ancoragem**
 - Parafusos
 - Ganchos
 - Fios de cerclagem
- **Longitudinais**
 - Hastes
 - placas
- **Conectores transversais**
- **Acessórios**
 - arruelas



Diâmetro do Implante

4mm threaded rod

$$I = 5.14\text{mm}^4$$

4mm solid rod

$$I = 12.6\text{mm}^4$$

5mm solid rod

$$I = 30.6\text{mm}^4$$



R_1
 R_2
 R_3

Rod diameter

4mm threaded

4mm solid

5mm solid

6mm solid

7mm solid

Moment of Inertia (I)

$$5.14\text{mm}^4$$

$$12.56\text{mm}^4$$

$$30.60\text{mm}^4$$

$$63.50\text{mm}^4$$

$$118.0\text{mm}^4$$

Stiffness is proportional to I

I



Componentes de Ancoragem



- **Penetrantes**

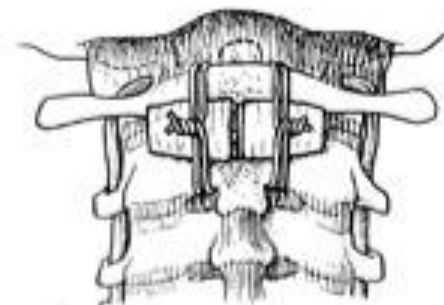
- parafusos



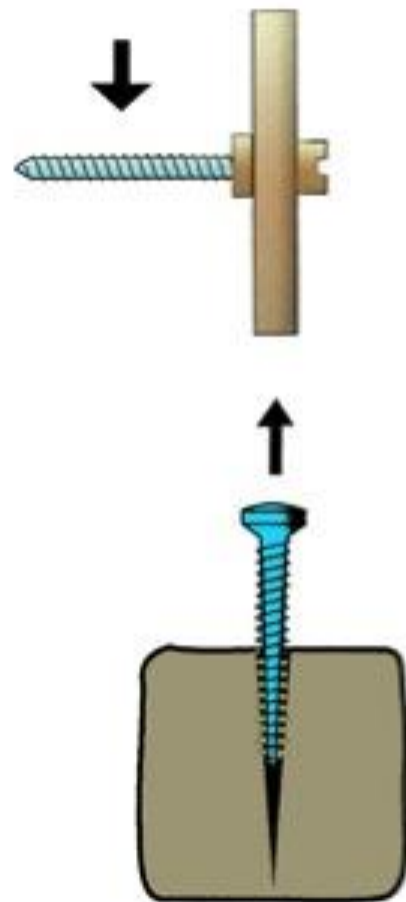
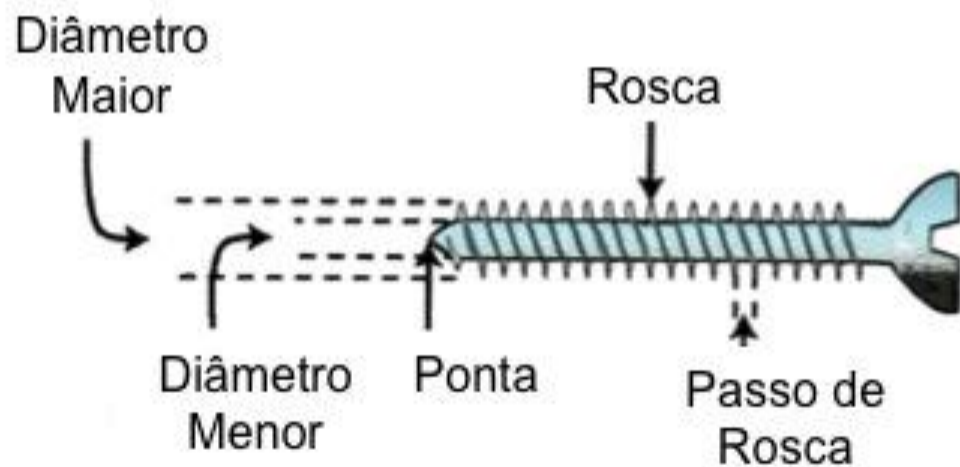
- **Não penetrantes**

- ganchos

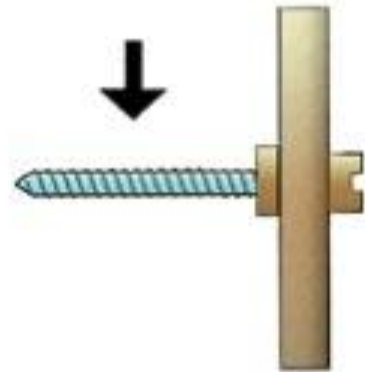
- fio sublaminar



Parafusos do Sistema de Fixação Vertebral



Parafusos

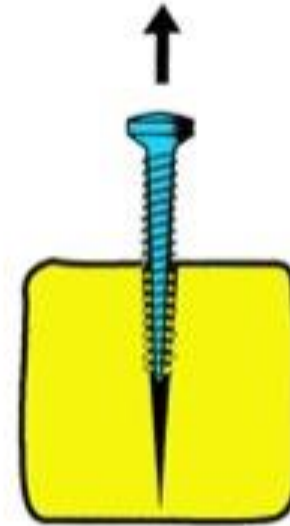


diâmetro interno

$$R = \pi d^3 / 32$$



Pullout



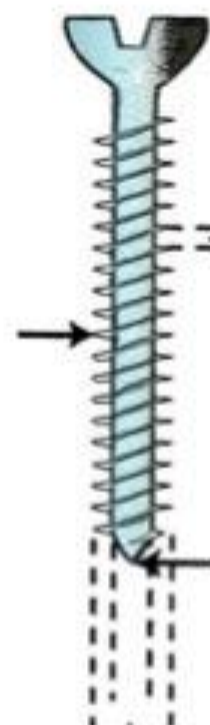
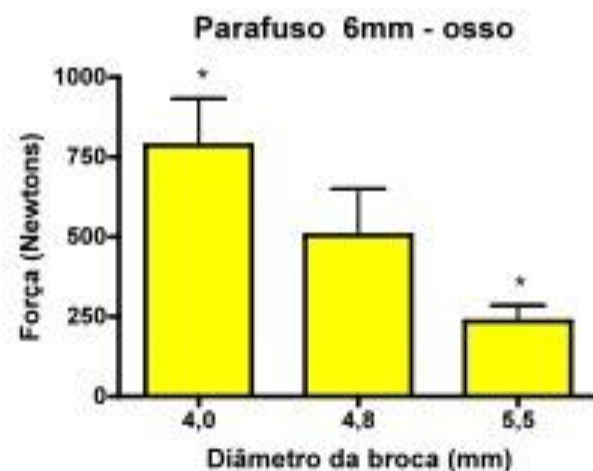
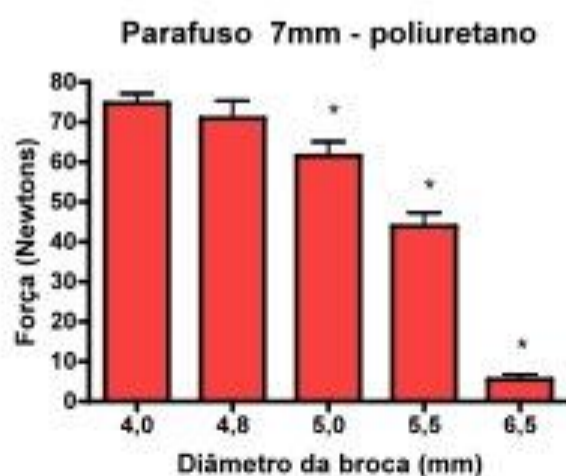
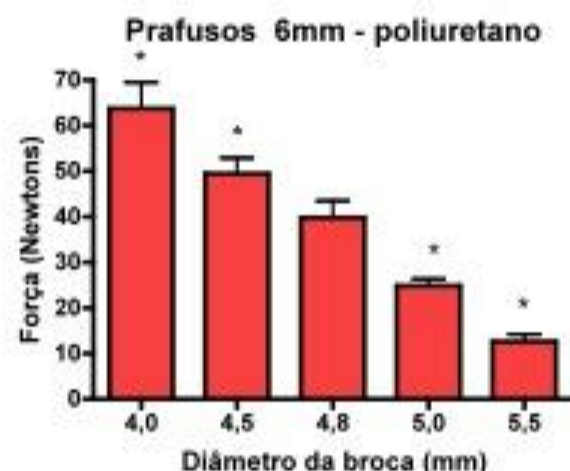
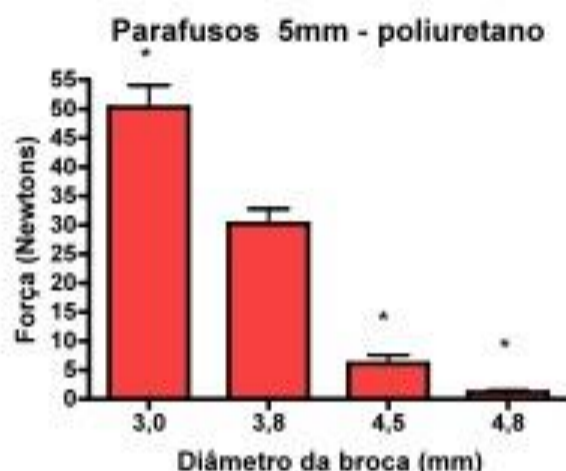
-densidade óssea
-diâmetro externo
-orifício piloto

Probe

Drill



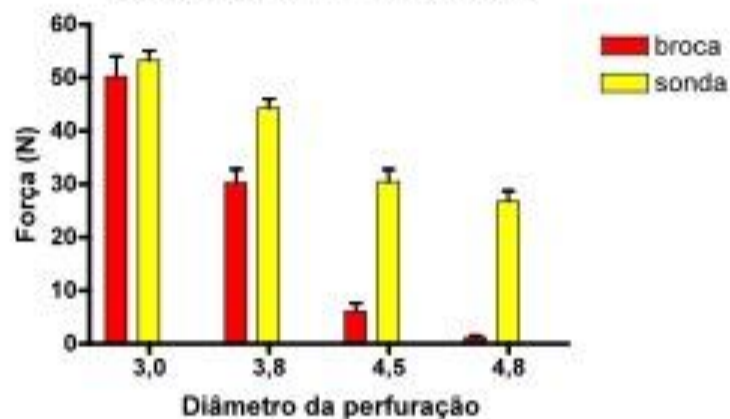
Diâmetro da Perfuração / Diâmetro Interno



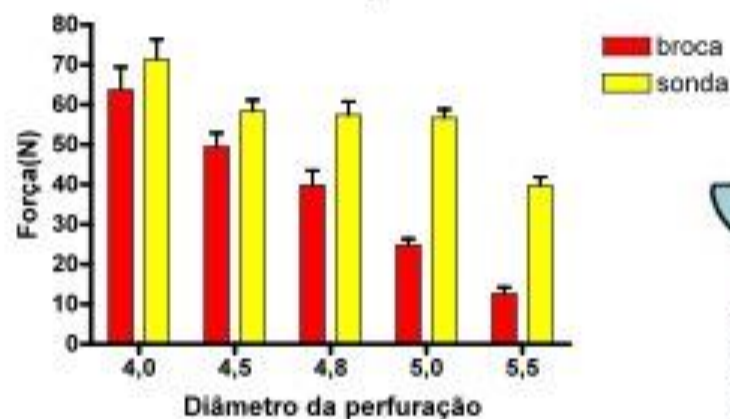
Influência do diâmetro e tipo da perfuração (broca x sonda)



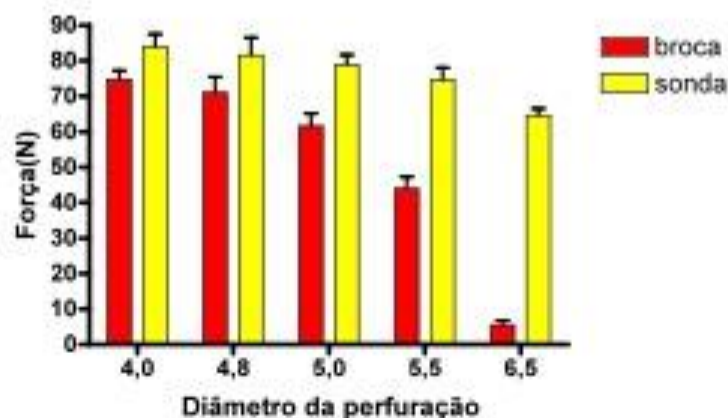
Parafusos 5mm -poliuretano



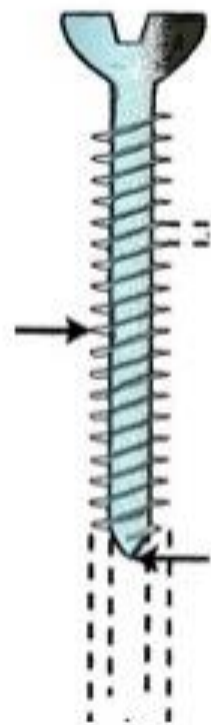
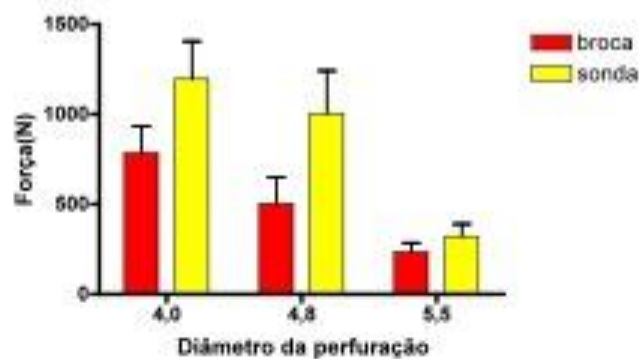
Parafusos 6mm-poliuretano



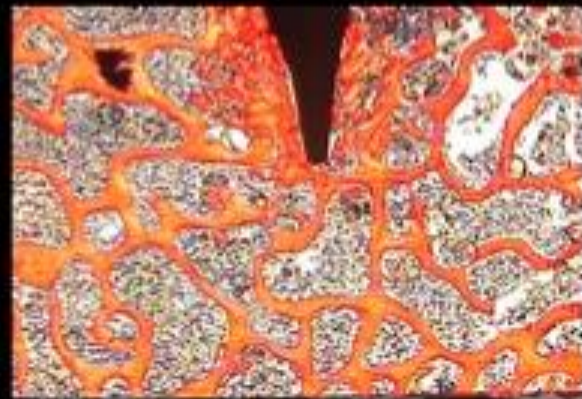
Parafusos 7mm-poliuretano

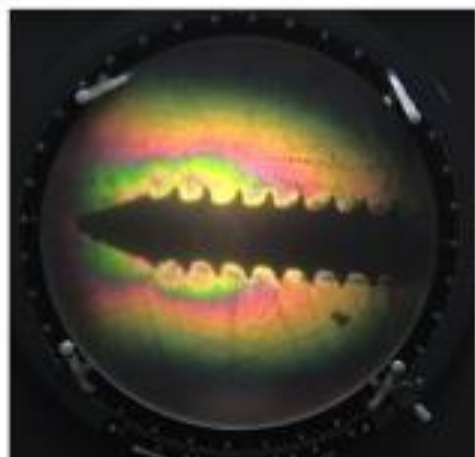
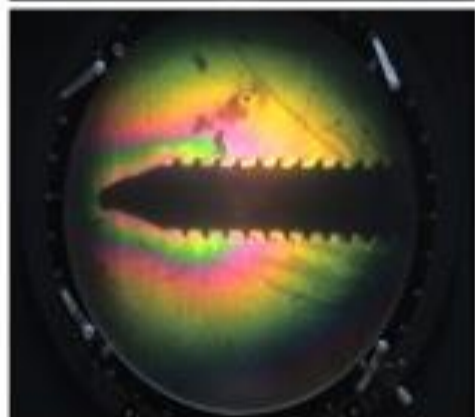
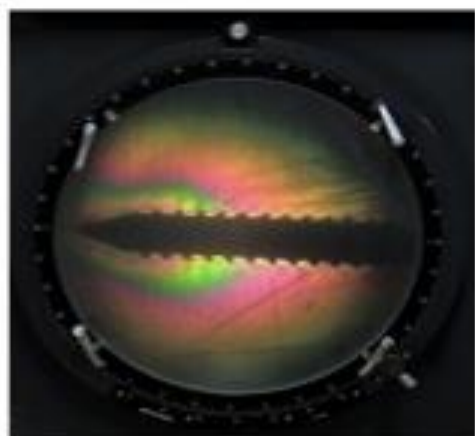


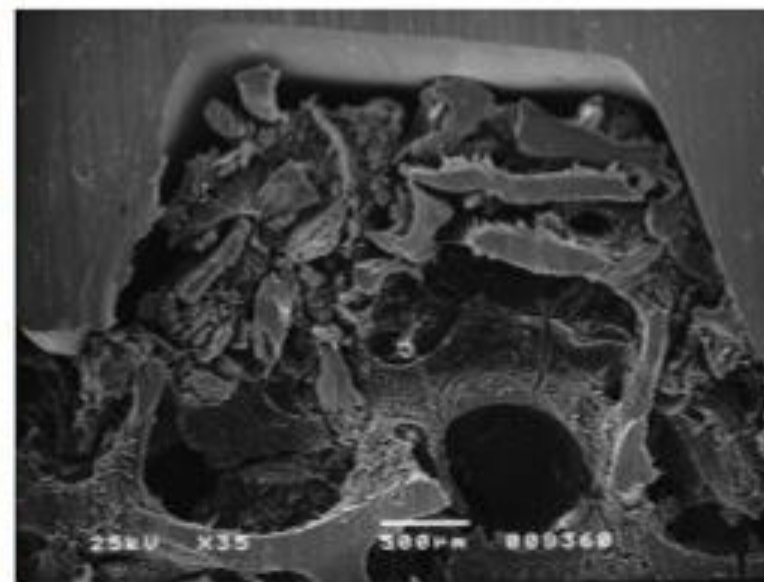
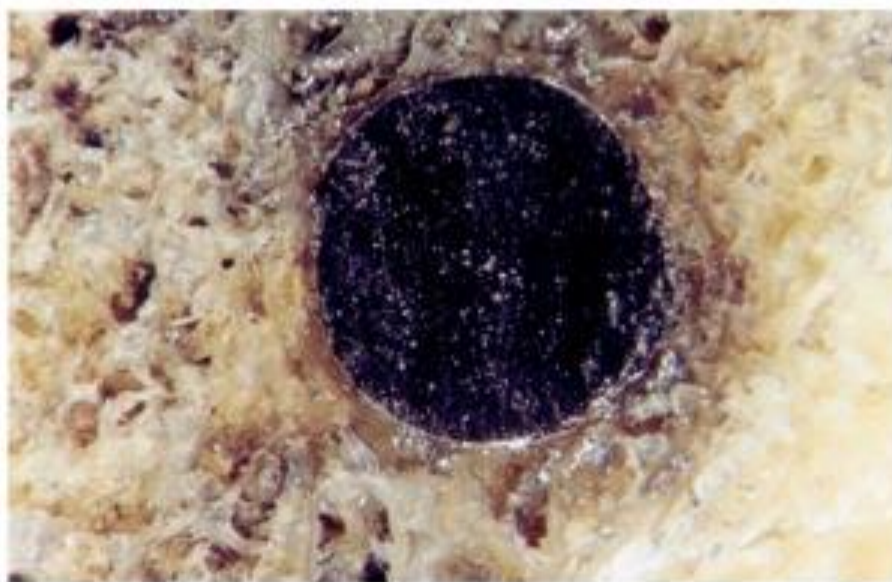
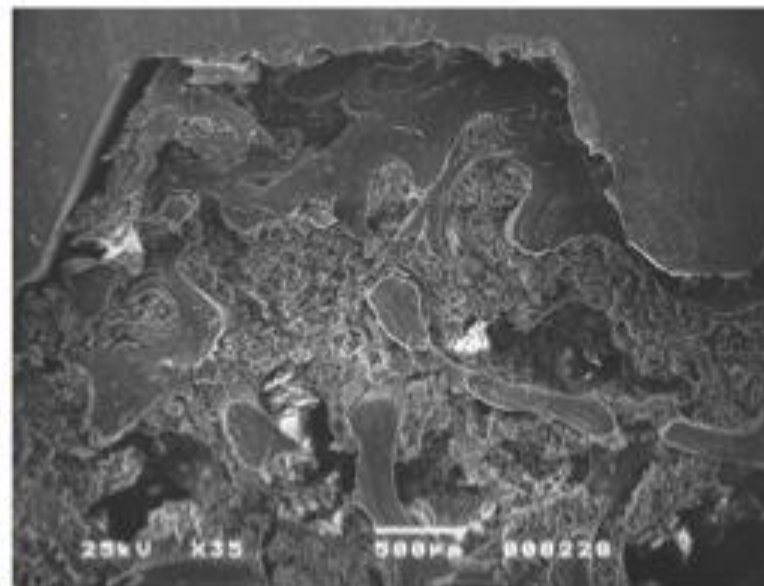
Parafusos 6mm-osso



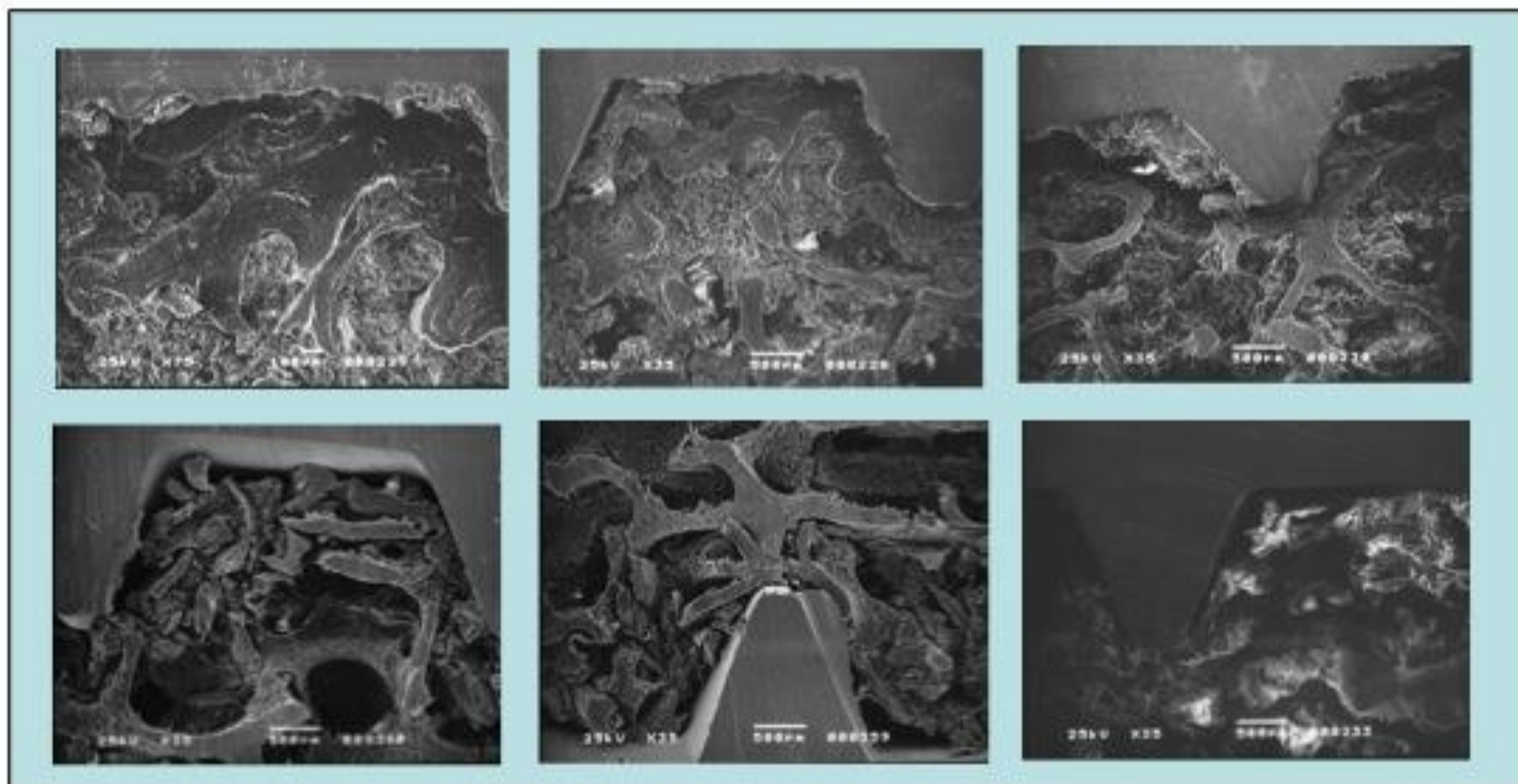
Interface implante / osso

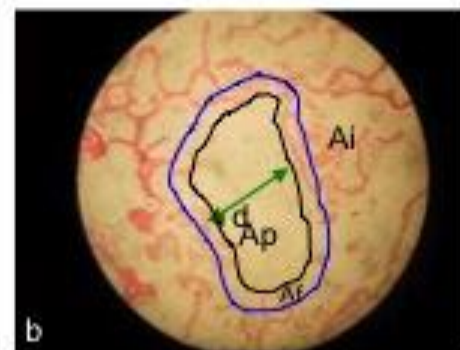
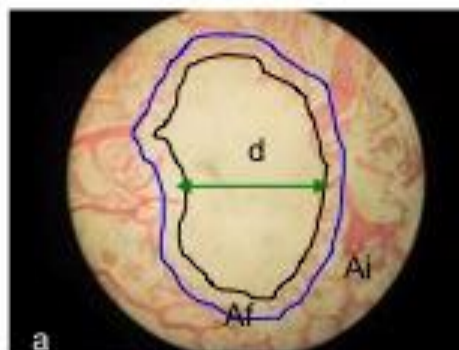




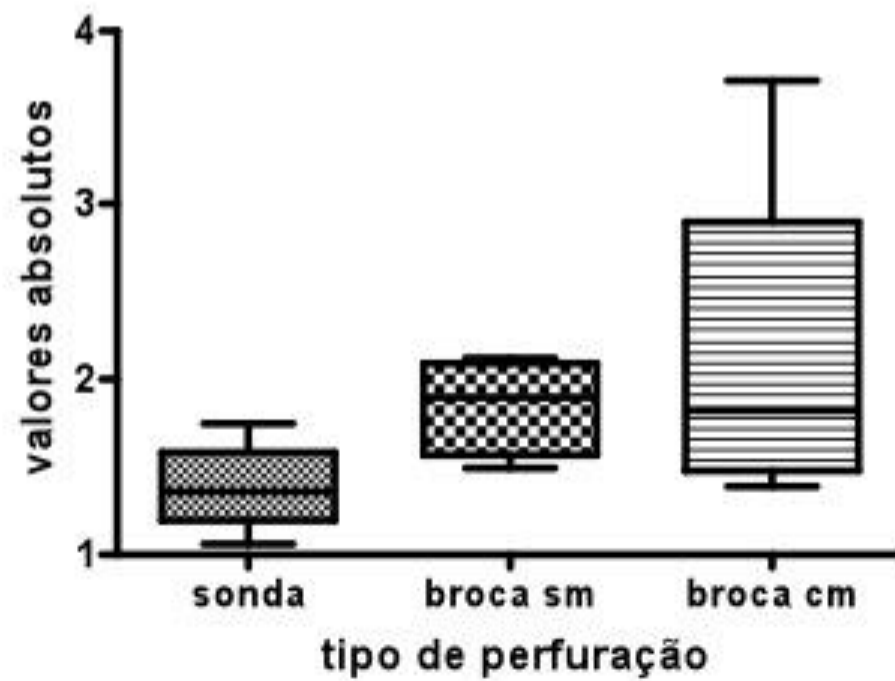


Interface implante / osso



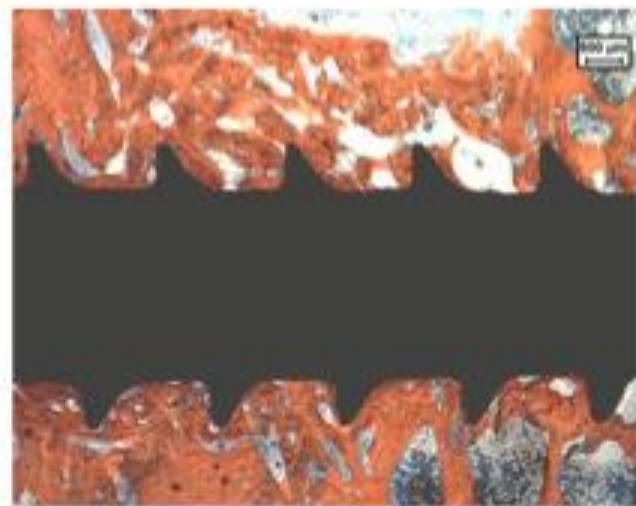


Índice de fragmentação Af/Ai

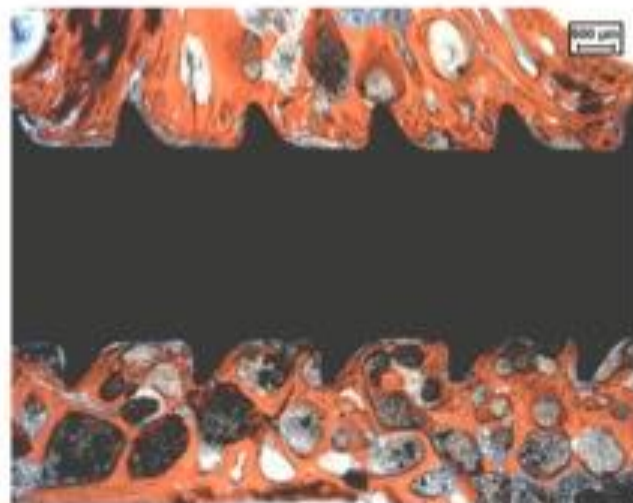




2,0mm



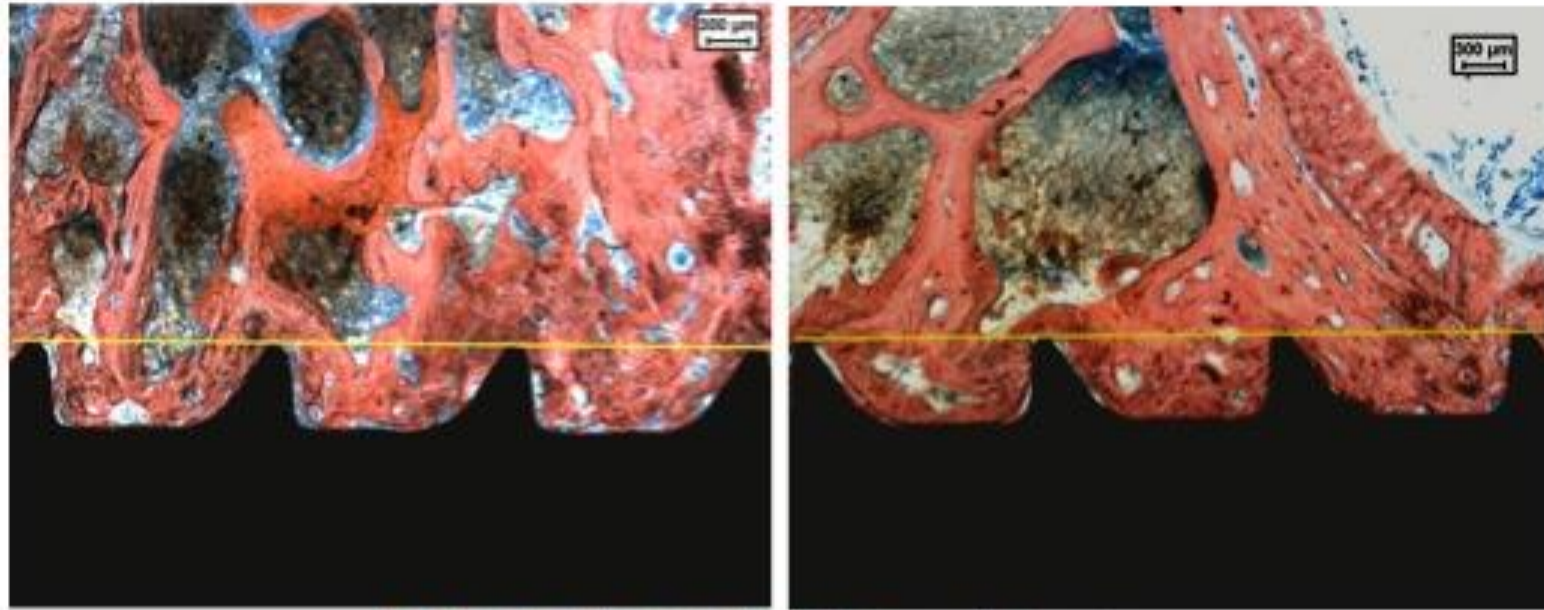
2,8mm



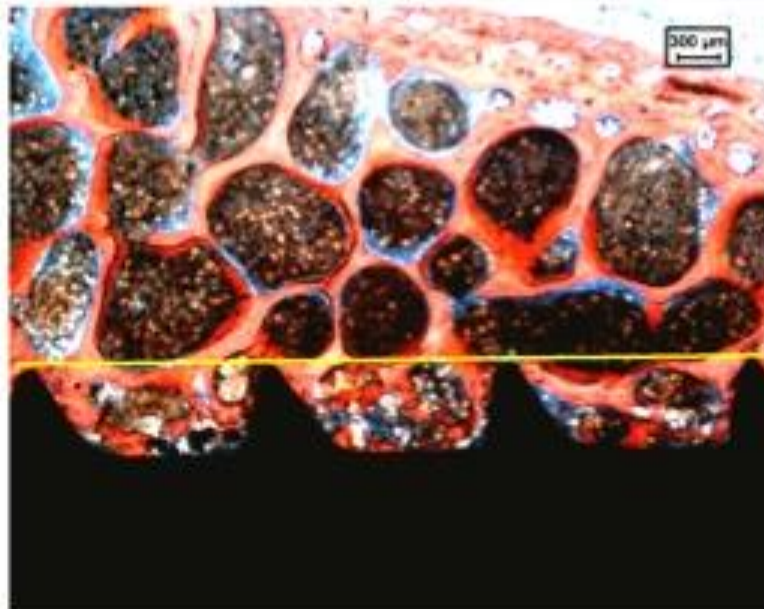
3,2mm

x 16

BA (área osso)



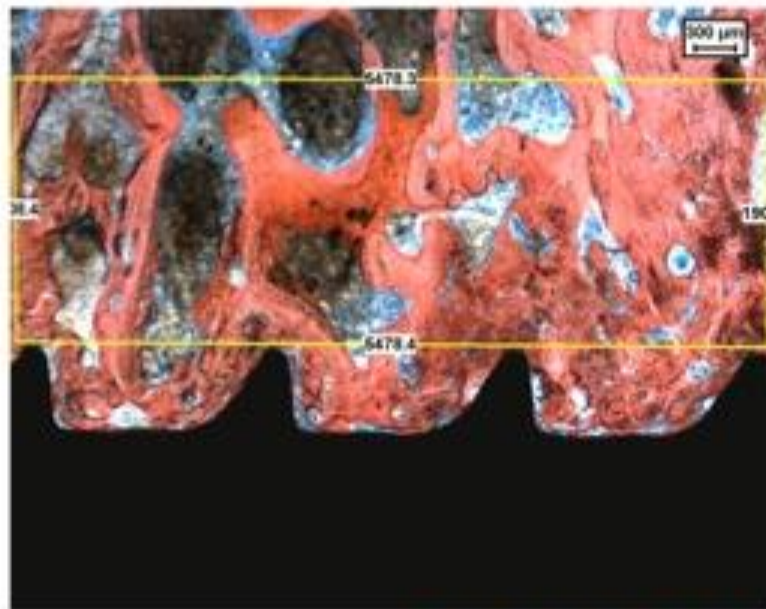
2,0mm



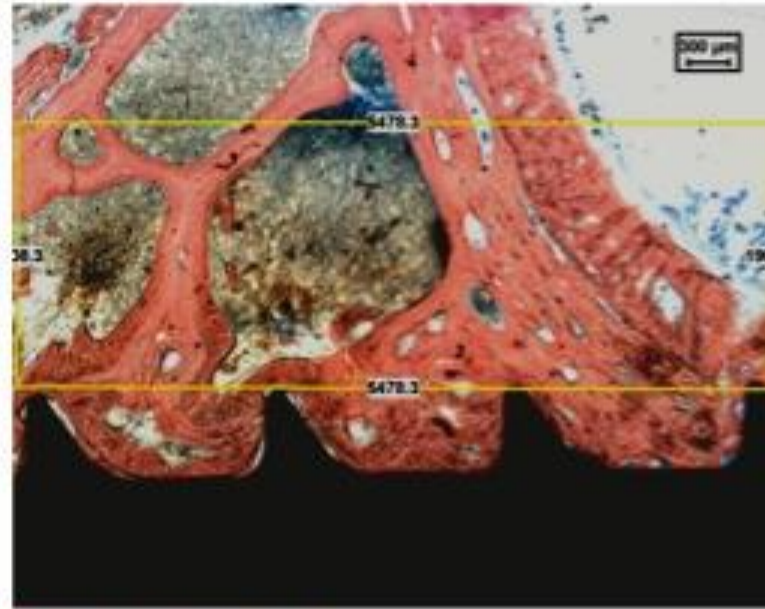
2,8mm

3,2mm

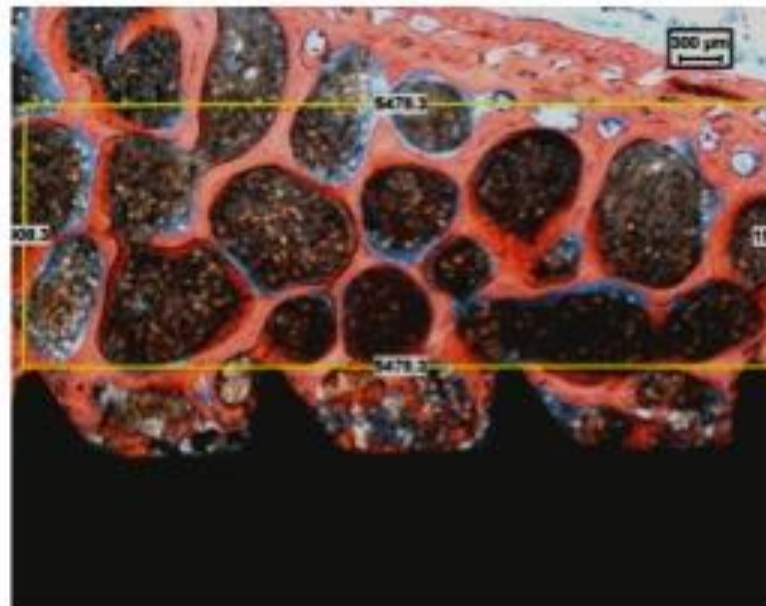
BAR



2,0mm



2,8mm

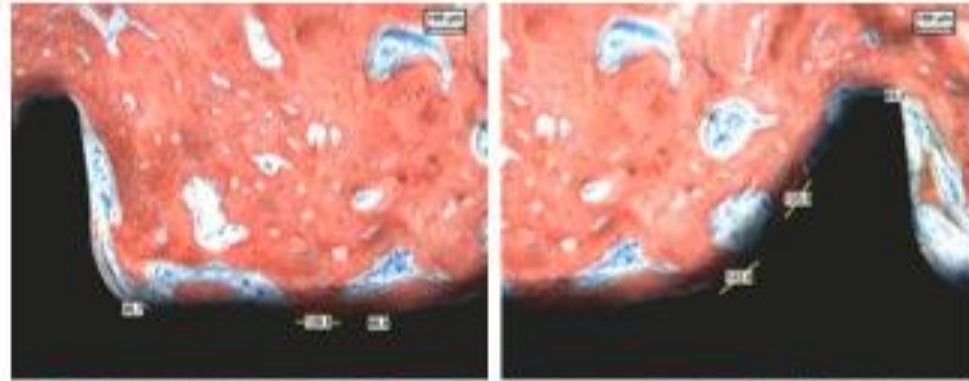


3,2mm

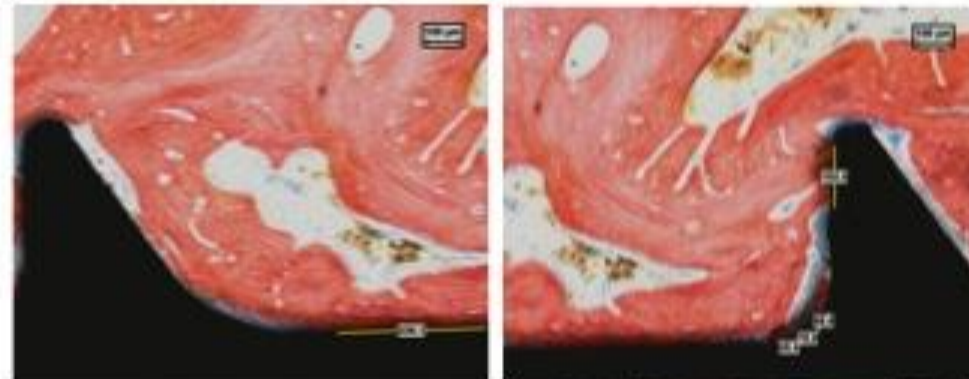
5478,3(23,2827mm)x1908,3(8,110275)

x 2.5

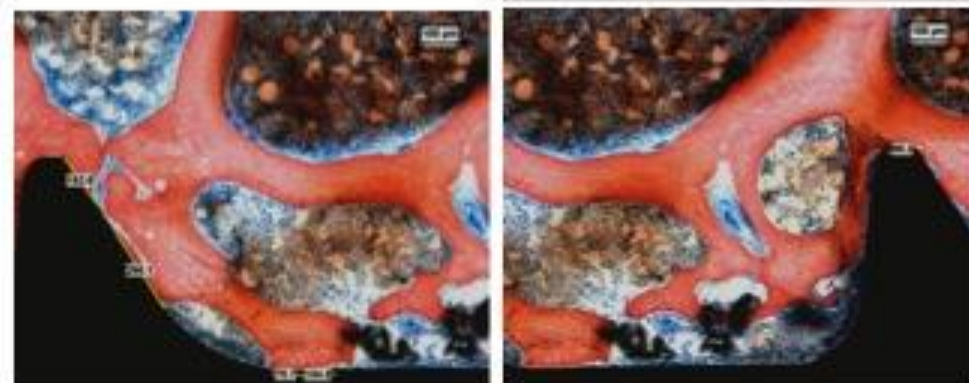
BIC



2,0mm



2,8mm

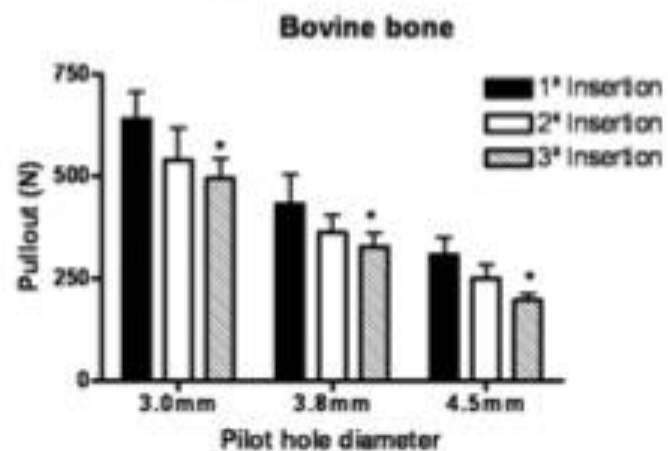
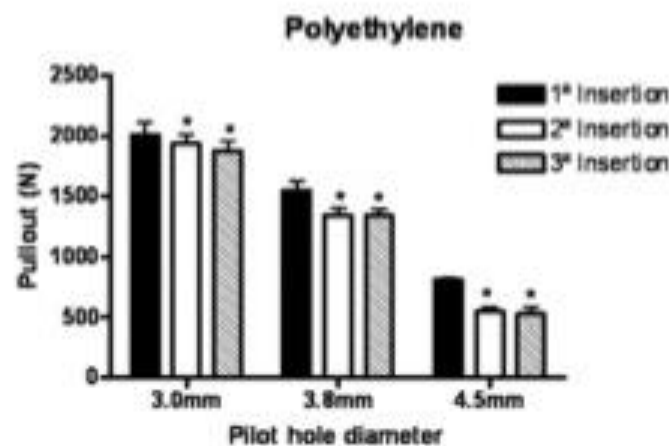
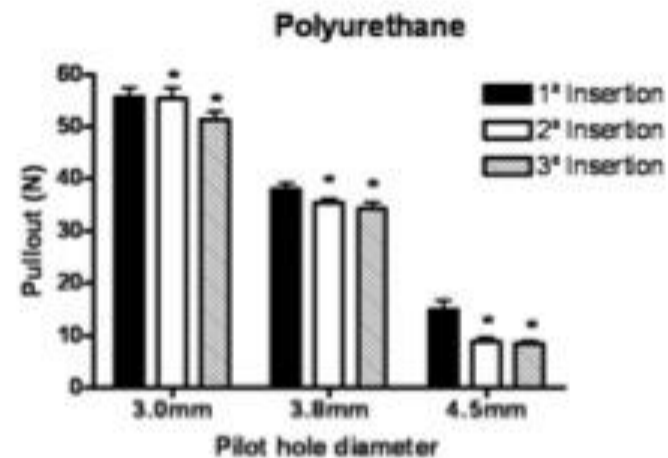
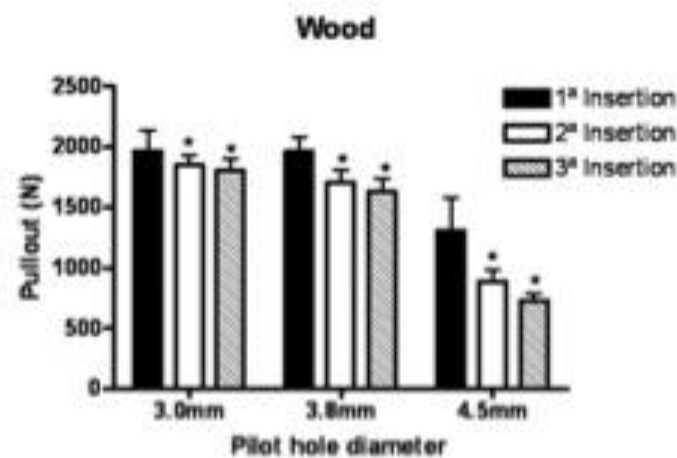


3,2mm

x 10

The Effect of Repetitive Pilot-Hole Use on the Insertion Torque and Pullout Strength of Vertebral System Screws

Helton L. A. Defino, MD, PhD,* Rodrigo César Rosa,* Patricia Silva,*
Antonio Carlos Shimano,* José Batista Volpon,* Francisco José Albuquerque de Paula,†
Philipp Schleicher,‡ Klaus Schnake,‡ and Frank Kandziora‡
SPINE Volume 34, Number 9



Conclusões