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Bone Cement

Best practices in cementing for better outcomes

Objective: Obtain optimal cement adhesion and penetration for better implant-cement-bone interlock and decreased loosening[1]

Implant/glove cleanliness:

Clean/dry implant surfaces increases cement adhesion strength[7]

1. Use clean/dry gloves to prevent contamination
2. If necessary, quickly clean implant contamination with alcohol to reduce risk (<4 min)

Bone cleanliness:

Pulsed lavage increases cement penetration[5] and reduces radiolucent lines[8]

1. Dry bone after lavage[6]
2. Lavage cleans away blood, debris, bone marrow, and fat, which decreases cement penetration resistance[5]

Cement penetration:

3-5mm is the optimal cement mantle[2]

1. Apply cement equally to tibial component and tibial bone by either spatula or ingerpacking[3,4]
   - 10-16 grams of cement roughly correlates to 3-5mm cement penetration[3]
   - Application via gun injection leads to 5+mm cement mantlen[3]
2. Control bone bleeding (tourniquet, TXA, etc)
   - Bone bleeding can displace cement or create cement voids preventing interlock especially when cement viscosity is low[8]
3. Allow cement to reach dough stage
   - Earlier than dough stage decreases penetration[9]
   - High viscosity cement doughs quickly and the viscosity remains constant during working[10]
4. Apply constant pressure
   - Impact time is short, therefore, cement is not lowing/penetrating bone
   - Extend knee after prosthesis insertion and do not disturb[9]

Bone survival:

Cement temperature and quantity affects bone survival

1. <44°C/111°F for 1 minute = no major changes in bone formation to implant[6]
2. >5mm cement mantle leads to bone necrosis[3,4] due to increased thermal damage

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