AN ORTHOPAEDIC SURGEON'S POINT OF VIEW

Orthopaedic surgeons seldom recognize an implant as the result of materials and technological processes connected to the history of our surgery and the one from our industries.

Coming back to the earlier days, we have:

- **1890** Gluck, a german surgeon, with a hip, knee and shoulder made out of ivory.
- **1922** Ivory is used by Hey-Groves ; then Bohlman in metal and glass.
- **1938** : thanks to dental Vitallium, hips are made of this cobalt chrome.
- **1946 :** Brothers Judet of France advance hip joint.
- **1950 :** Austin Moore and alternative Mac Kee in cobalt chrome molydbdenum.
- **1959** John Charnley of UK introduces poly ethylene, reduces the friction with a head 22.2mm and becomes dominant of the market. The stem is in stainless steel.
- **70's** : wide expansion of Charnley Thackray school by Gérard in France et Freeman in the UK.

Titanium stems then became more popular, coated with HA, with a metal back acetabular cup with PE, all cementless.

The surgeon's choices are multiple and he will select dependant on the patient and the available technologies with a strategy:

- lasting with the trade off wear to life time, implant-bone relation within proper osteo-integration.
- available tooling needed to conduct the orthopaedic surgery.

Materials & Industrial processes : What's in it ?

The history provides answers to many questions.

Stem material must adjust to the bone for fear of loosening.

- Elasticity modulus ratio as close as that of bone, 5 to 10 for titanium und close to 1 for PEEK.
- Corrosion resistance.
- Surface or coating.
- Friction coefficients to restrict debris due to wear:
  - ceramic - ceramic,
  - ceramic or stainless on PE,
  - metal-metal.

Does the surgeons know all this ?

Technology, information, cost and regulatory aspects are limiting factors and play a role in the selection.

Biocomp remains most important and management of risks must be fully conducted.

Mechanical aspects with ramification on pitting corrosion, crevices, metals to metal electricity, wear, debris must be looked at.

Process controlling is critical particularly in the raw materials sourcing, interoperation cleaning, decontamination and interaction between materials where process changes must be carefully documented.

Materials and processes for use in orthopaedics are detailed in this PocketBook, and these are some of the « built in » technologies that we currently use with a high level of confidence.

Partner

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