Bioretec Research & Development

ActivaScrew™ Interference Comparison to PLLA Based Competitors

1. General

ActivaScrew™ Interference is manufactured from PLGA (85% L-lactide/15% Glycolide). This composition gives ideal absorption properties. Pure PGA would absorb completely in few months, which would lead excessive release of acidic absorption products and potentially cause inflammatory reactions. On the other hand, pure PLLA absorption would take up to 7 years and it tends to form stable crystalline particles at the later stage of absorption process, which could cause reportedly foreign body reactions. Combination of these two polymers in PLGA, used in ActivaScrew™ Interference, gives optimal absorption profile; It has slower absorption than PGA without PLLA’s harmful crystalline particle formation.

ActivaScrew™ Interference is manufactured using novel proprietary technology, which improves its ductility and strength over PLLA competitors (ConMed, Arthrex) and which provides very unique Self-Locking™ feature.

2. Mechanical Properties

Figure 1. In Vitro Mechanical properties of ActivaScrew™ Interference vs. PLLA

![Figure 1. In Vitro Mechanical properties of ActivaScrew™ Interference vs. PLLA](image)

Figure 2. ActivaScrew™ Interference Ø4 and Ø10 mm diameter

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Interference’s unique manufacturing technique provides very high initial mechanical properties and produces Self-Locking™ feature. Self-Locking™ is based on screw diameter change (up to 7%) during first weeks after surgery (Figure 2.). This supports effectively high fixation strength during the healing period by compensating compression creep of the screw.

3. Mass Loss

The graph in the Figure 3. shows mass loss of ActivaScrew™ Interference starting just after 20 weeks and according the same graph the complete absorption takes about two years. In contrast PLLA’s mass loss has not practically started during the first 70 weeks and its complete absorption takes up to 7 years1,3.

4. Clinical Outcome

Over 40 000 ActivaScrew Interference implants have been clinically used, without any inflammatory reactions. Instead there have been several reported complications related to PLLA interference screws. These are often due to PLLA’s extremely slow absorption and increase of crystallinity during absorption as seen in Figure 4. These two phenomena together cause formation of stable crystalline particles, debris, which could cause inflammatory or other adverse tissue effects3,4.
REFERENCES

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