Loosening of pedicle screw

Loosening of pedicle screws is a frequent complication after spinal surgery. Implant colonization with low-virulent microorganisms forming biofilms may cause implant loosening. However, the clinical evidence of this mechanism is lacking.

Prinz et al., evaluated the potential role of microbial colonization using sonication in patients with clinical pedicle screw loosening but without signs of infection.

All consecutive patients undergoing hardware removal between January 2015 and December 2017, including patients with screw loosening but without clinical signs of infection, were evaluated. The removed hardware was investigated using sonication.

A total of 82 patients with a mean (± SD) patient age of 65 ± 13 years were eligible for evaluation. Of the 54 patients with screw loosening, 22 patients (40.7%) had a positive sonication result. None of the 28 patients without screw loosening who served as a control cohort showed a positive sonication result ($p < 0.01$). In total, 24 microorganisms were detected in those 22 patients. The most common isolated microorganisms were coagulase-negative staphylococci (62.5%) and Cutibacterium acnes (formerly known as Propionibacterium acnes) (25%). When comparing only the patients with screw loosening, the duration of the previous spine surgery was significantly longer in patients with a positive microbiological result (288 ± 147 minutes) than in those with a negative result (201 ± 103 minutes) ($p = 0.02$).

The low-virulent microorganisms frequently detected on pedicle screws by using sonication may be an important cause of implant loosening and failure. Longer surgical duration increases the likelihood of implant colonization with subsequent screw loosening. Sonication is a highly sensitive approach to detect biofilm-producing bacteria, and it needs to be integrated into the clinical routine for optimized treatment strategies [1].

1)
Prinz V, Bayerl S, Renz N, Trampuz A, Czabanka M, Woitzik J, Vajkoczy P, Finger T. High frequency of low-virulent microorganisms detected by sonication of pedicle screws: a potential cause for implant failure. J Neurosurg Spine. 2019 May 28:1-6. doi: 10.3171/2019.1.SPINE181025. [Epub ahead of print] PubMed PMID: 31137006.