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LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

TRI DENTAL IMPLANTS

A new implant system with directly screwed supraconstructions: Impact of restoration material and artificial aging on bending moment of single-unit FDPs on implants.

Investigators


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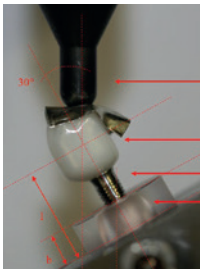
Objective

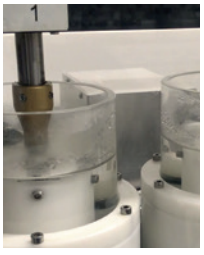
Investigation of the bending moment before and after chewing simulation of implants restored with directly screwed single-unit FDPs from various materials (**matrix®**) compared to implants restored with identical materials luted to a titanium base.

Control Group TRI® Ti-Base



- Test set-up according to ISO 14801:2016
- Worst case set-up
- Simulation of 3 mm of bone loss
- 30 degrees angulation
- Long crown

Study Group matrix®



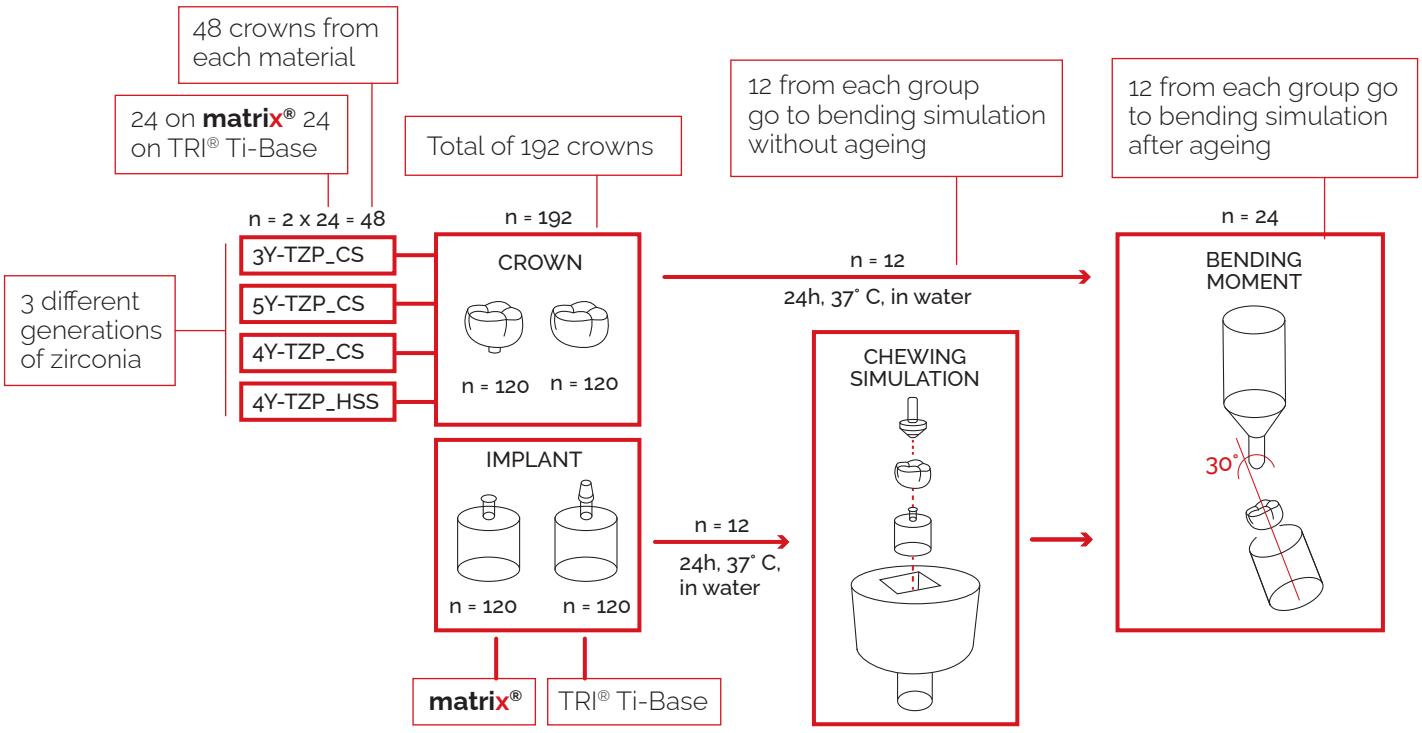
- Chewing/ageing simulation
- 1,2 million cycles
- 50 N
- 1,3 Hz
- 0,7 mm lateral movement
- 6000 Thermocycling (5˚/55˚C)
- Antagonists: Steatit balls

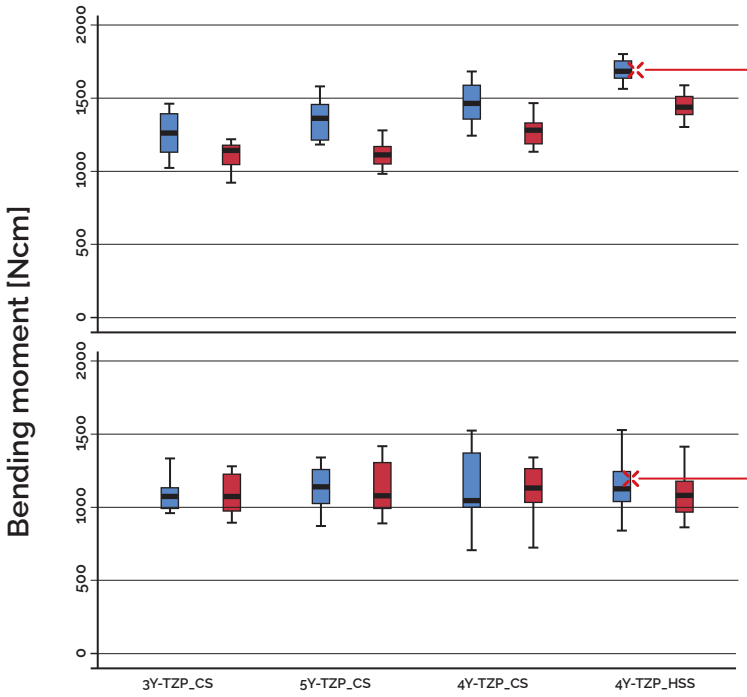
CONCLUSION

Both **matrix®** and Ti-Base exhibit similar stability values. **matrix®** implants appear to be appropriate for clinical use with all tested zirconia materials.

Strong as an Abutment

Study Flowchart





Results

matrix® is significantly stronger than Ti-Bases before ageing

matrix® and Ti-Bases are on the same very high level after ageing.

No other zirconia abutment reaches values way above 1000 N. As an example, an Astra Tech™ Zirconia abutment only reached 216 N in an equivalent testing set-up (Mühlemann et al 2014).

Methods

120 implants with TRI® Classic Implant Line Tissue-Level and 120 implants without a titanium base **matrix®** Implant Line were restored with single-unit FDPs manufactured from conventionally sintered (CS) 3Y-TZP, 5YTZP, 4Y-TZP as well as high-speed sintered (HSS) 4Y-TZP. Half of the specimens were aged using chewing simulation (1,200,000 x, 50 N, TC: 5/55°C, 6,000 x). Fracture load (FL) was measured, bending moment (BM) was calculated and failure types were analyzed. Data were analyzed using Kolmogorov-Smirnov-test, one-way ANOVA followed by post-hoc-Scheffé, t- and Chi2-test ($p < 0.05$).