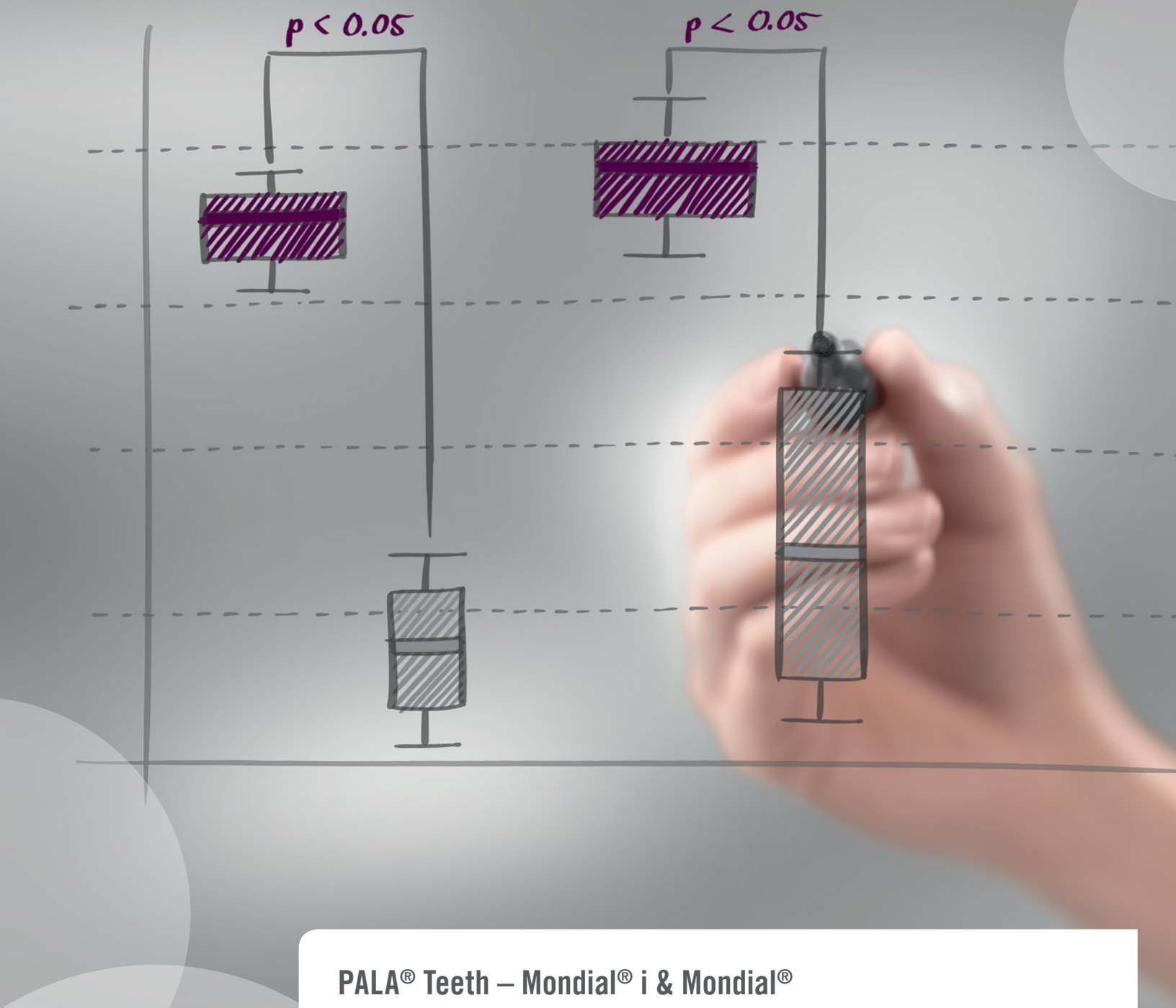
PALA®
Scientific Information



PALA® Teeth – Mondial® i & Mondial®

Scientific Studies.

The ability of denture teeth to retain their original color is essential – both for patient satisfaction and to prevent the need for re-making prostheses. Two factors that can affect shade accuracy during clinical use are plaque resistance and color stability.

The following two in vitro studies demonstrate the excellent plaque resistance and color stability of NanoPearls® material, which is used to fabricate both Mondial i and Mondial denture teeth.

Giving a hand to oral health.

KULZER
MITSUI CHEMICALS GROUP

Color Stability Study.

Adhesion of streptococcus mutans NCTC 10449 to artificial teeth: An in vitro study

S. Hahnel, M. Rosentritt, R. Bürgers, G. Handel, Regensburg University Medical Center, Germany

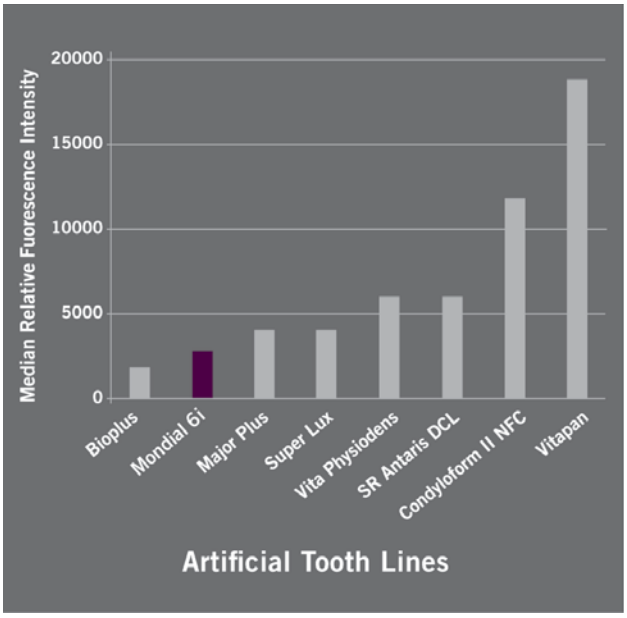
Objective

The aim of this study was to evaluate the susceptibility of artificial teeth to adhesion of the oral bacterium Streptococcus mutans. Bacterial colonization is one aspect in the clinical performance of dental materials.

Materials & Methods

The specimens were incubated with Streptococcus mutans NCTC 10449 suspension for 2.5 hours at 98.6°. Adherent bacteria were quantified through fluorometric assay. The relative fluorescence intensity correlates linearly with the amount of adherent bacteria. Medians and 25 % and 75 % percentiles were calculated.

Results



Conclusions

Mondial 6i and Bioplus showed the lowest values of adhesion to streptococcus mutans without significant difference between them, while significant differences were observed between Mondial 6i and other teeth tested. The authors recommend dental material with low susceptibility to microorganism adhesion to avoid plaque and denture stomatitis.

The study was summarized by Kulzer.
Source: Journal of Prosthetic Dentistry. 2008 Oct; 100(4):309-15

Adhesion of streptococcus mutans NCTC 10449 to artificial teeth: An in vitro study. S. Hahnel, M. Rosentritt, R. Bürgers, G. Handel, Regensburg University Medical Center, Germany

Effect of polymerization methods and thermal cycling on color stability of acrylic resin denture teeth

W. Accunção, V. Barão, M. Pita, M. Goiato, Araçatuba Dental School, São Paulo, Brazil

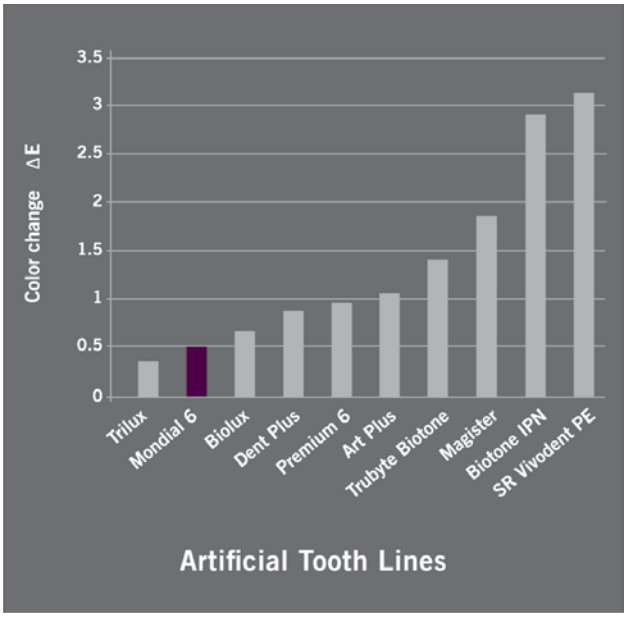
Objective

Discoloration of denture teeth can be a problem during clinical use. The aim of the study was to determine the effect of denture base polymerization methods and thermal cycling on the color change of artificial teeth.

Materials & Methods

The color of ten different tooth lines was measured before polymerization, after polymerization (165.2° / 9 hours) and after thermal cycling with a spectrometer. Thermal cycling was done 5,000 times between 41° and 131° in intervals of 30 seconds. The mean color difference (ΔE) was calculated between the thermal cycling and before polymerization.

Results



Conclusions

Mondial 6 and Trilux showed the lowest color difference without significant difference between them, while significant differences were observed between Mondial 6 and other teeth tested. While the authors do not see clinically discernable color differences, Δ E > 2 can usually be recognized as shade differences.

The study was summarized by Kulzer.
Source: Journal of Prosthetic Dentistry 2009 Dec; 102(6):385-92

Effect of polymerization methods and thermal cycling on color stability of acrylic resin denture teeth. W. Accunção, V. Barão, M. Pita, M. Goiato, Araçatuba Dental School, São Paulo, Brazil

Strength Study.

Strength of Synthetic Polymer Teeth on the Denture Base

F. Beuer, K. J. Erdelt, R. Friedrich, K. Köbele-Bogai, M. Eichberger, W. Gernet,
Department of Prosthodontics, Ludwig Maximilian University, Munich, Germany

Objective

This study examined the influence of macro-retention, chemical compounds and the denture teeth used on the strength of the denture teeth on the denture base. In addition, artificial aging was conducted to provide information regarding the long-term stability of the strength.

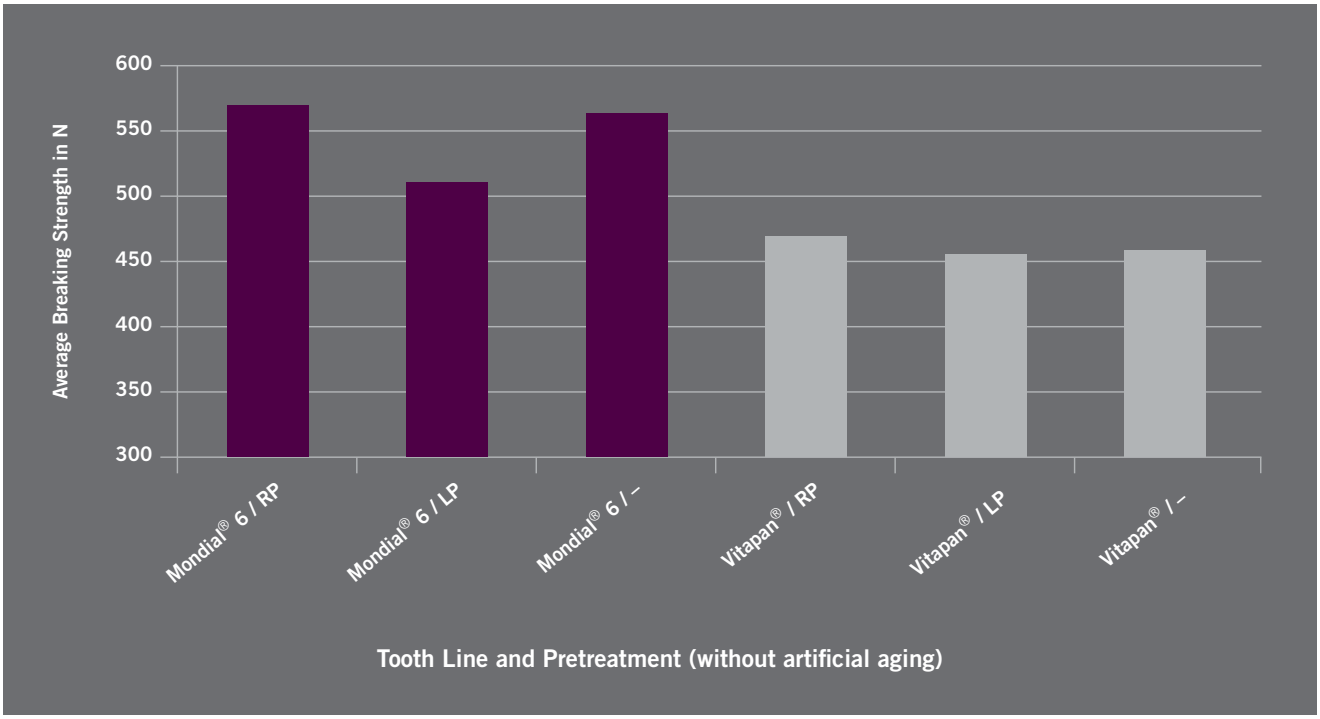
Materials & Method

The teeth of two manufacturers were roughened basally and cervically with a diamond burr of 50µm grain. Then some of the teeth were treated with macro-retention. Used were cross cuts (R) and core drills (L). The teeth that were treated macro-retentively were pre-treated with the respective recommended bonding agent and were then polymerized with synthetic PalaXpress to the test specimen according to manufacturer's instructions. Another set of teeth was only moistened with monomer (-) and then polymerized in the same manner. The artificial aging by means of alternating thermal load was conducted with one half each of the test specimens at 10,000 cycles between 5°C and 55°C. Based on the completed and partially aged test specimens the maximal load was determined until a break with a 45° initial load.

Conclusion

The test specimens with Mondial® showed significantly higher breaking strength in all 3 pretreatment types than test specimens with Vitapan®. With additional macro-retention no improvement of the breakage strength could be observed with either Mondial® or Vitapan®. Artificial aging significantly weakens breakage strength. For Mondial® it is significantly above the maximum loads observed in partial denture cases.

Results



Strength of Synthetic Polymer Teeth on the Denture Base
F. Beuer, K. J. Erdelt, R. Friedrich, K. Köbele-Bogai, M. Eichberger, W. Gernet
Department of Prosthodontics, Ludwig Maximilian University, Munich, Germany

PALA®

Wear and Break Study.

2-Media-Wear Resistance of Denture Teeth in the Chewing Simulator

M. Eck, K. Renz, K. Ruppert, F. Stange
Kulzer GmbH, Wehrheim/Hanau/Wasserburg, Germany

Objective

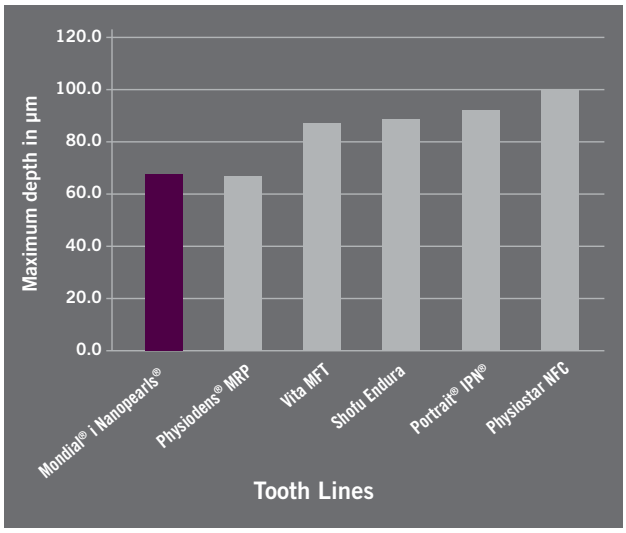
Denture teeth are subjected to constant wear in the mouth. The purpose of this examination is the determination of the abrasion strength of various dental materials in the 2-media chewing simulation.

Materials & Method

The 2-media chewing simulation is a common method which was refined by the University of Heidelberg in co-operation with Kulzer. Thus, it was possible to noticeably reduce standard deviations by using attenuators.

The pre-selected teeth were placed into the chewing support. Prior to the insertion any slight unevenness was leveled with fine sandpaper. Al2O3-pellets with a diameter of 4.75 mm were used as antagonist. The trial ran for 200,000 cycles with a horizontal movement of 0.8 mm under 50N pressure. The evaluation was done with a surface laser.

Results



Conclusions

Of the 6 tested tooth lines Mondial i shows significantly lower wear than other materials in the test. There was no significant difference between Mondial i and Physiodens. Vita MFT, Shofu Endura, Portrait IPN and Physiostar NFC had the highest wear in this test.

Source: Research & Development, Kulzer Wehrheim, Germany

2-Media-Wear Resistance of Denture Teeth in the Chewing Simulator. M. Eck, K. Renz, K. Ruppert, F. Stange Kulzer GmbH, Wehrheim/Hanau/Wasserburg, Germany

Break Resistance of Standardized Test Specimens Made of Denture Teeth

M. Beyer, K. Kerscher, K. Renz, N. Schönhof, F. Stange
Kulzer GmbH, Wehrheim/Hanau/Wasserburg, Germany

Objective

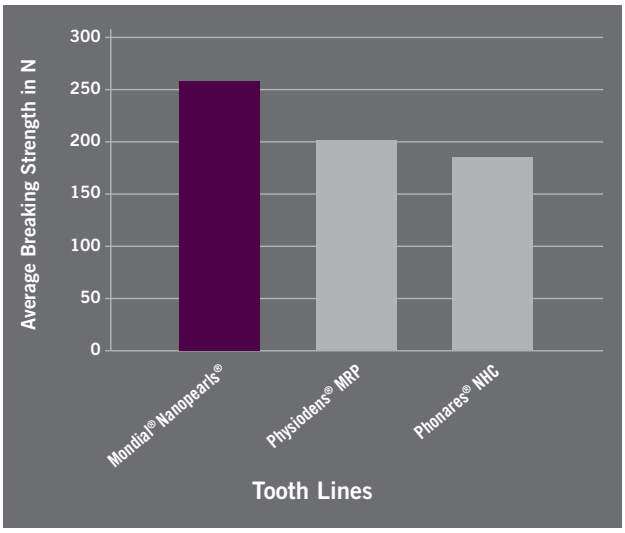
The forces exerted on denture teeth can lead to breakage in extreme situations. The purpose of this examination is the determination of the break resistance of various denture teeth independent from their exterior form.

Materials & Method

The teeth were embedded in denture base material and then were twisted into a cylinder of 6 mm in diameter. At a pre-defined location a predetermined breaking point was cut. The smallest diameter at the predetermined breaking point is 5 mm.

The prepared test samples were then subjected to an increasing amount of force at an angle of 90° until breakage. The breaking strength was determined with a Zwick Universal Test Unit for all dental lines.

Results



Conclusions

Mondial had the highest breaking strength, followed by Physiodens and Phonares. The differences are significant. It is recommended that denture teeth with a high breaking strength are used in order to ensure a high durability of dental lab work.

Source: Research & Development, Kulzer Wehrheim, Germany

Break Resistance of Standardized Test Specimens Made of Denture Teeth. M. Beyer, K. Kerscher, K. Renz, N. Schönhof, F. Stange. Kulzer GmbH, Wehrheim/Hanau/Wasserburg, Germany

TEE_BRO_3 Rev. 06/17