

INTERVIEW

“PALACOS® R+G HAS BEEN SYNONYMOUS WITH UNIQUE PRODUCT QUALITY WITH OPTIMALLY COMBINED, HIGH-QUALITY RAW MATERIALS AND ACTIVE INGREDIENTS.”

Prof. Kühn, a true expert in the field of PMMA bone cements, describes the historical development of the PALACOS® products and their uniqueness in arthroplasty.

Prof. Kühn, you have been working with bone cements for over 30 years and have dedicated your professional life to PALACOS®. What motivated you to pursue this career?

Polymers are an essential component of bone cements. They have always been constant companions in my professional career due to their groundbreaking importance in pharmaceutical technology. The fascination for PALACOS® came from the proximity to the product. I was impressed by the optimal production of innovative products with high pharmaceutical quality at Heraeus. The excellent and close cooperation with the developers of PALACOS® R+G and the group around Prof. Buchholz has preserved my passion for the PALACOS® bone cements until today.

“The ideal processing of PALACOS® R+G is outstanding: the optimal application phase, the hydrophilicity of the hardened bone cement and the corresponding release of antibiotics – all combined with optimal mechanical cement quality.”

How does PALACOS® R+G differ from other bone cements?

PALACOS® bone cements are based on an unchanged recipe and production since their market launch in 1958 and therefore stand for safety and reproducibility – it is not coincidence that all new developments on the market are based on PALACOS® R+G. PALACOS® R+G has been synonymous for unique product quality, with optimally combined high-quality raw materials and active ingredients. The ideal processing of PALACOS® R+G is also outstanding: the optimal application phase, the hydrophilicity of the hardened bone cement, and the corresponding antibiotic

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Brief profile

- Focus of scientific work:
 - chemistry and mechanics of PMMA bone cements as a material in arthroplasty
 - use of PMMA bone cements as local antibiotic carriers in orthopaedics and traumatology
- Personal concern: training of young surgeons on the use of bone cement
- Participation in the development of special bone cements, including PALACOS® MV, OSTEOPAL® V, COPAL® G+C

release – all combined with optimal mechanical cement quality. PALACOS® R+G is also characterised by ideal elastic and viscoelastic properties. This optimally dampens the load of the cemented prosthesis on the bone.

Prof. Buchholz played a decisive role in the invention of the antibiotic-loaded bone cement PALACOS® R+G. How did it come about?

Prof. Buchholz wanted to solve a serious clinical problem and develop strategies against periprosthetic infections. He saw clinical potential in the chemical release of residual monomer (MMA) from polymethylmethacrylate (PMMA) after the polymerisation of the bone cement. His idea: if small amounts of MMA were to dissolve from the prosthesis and distribute themselves in the surrounding tissue, pharmaceutical agents should also be able to elute from a PMMA matrix. That is why Prof. Buchholz began his experiment of adding Gentamicin powder to the PALACOS® R powder.

What role did Heraeus Medical play in the further development of PALACOS® R+G?

In 1968, Prof. Buchholz started to investigate the mechanisms of Gentamicin release from the bone cement matrix and the influence of add mix on the mechanical stability of the cement as an anchoring material for prosthesis. He therefore contacted Heraeus, then Kulzer, as the manufacturer and distributor of PALACOS® R. Heraeus was to test the extent to which the mixture of PALACOS® R and Gentamicin influenced the mechanical strength and other important cement properties. These results were published in 1970 and can be regarded as the actual birth of PALACOS® R+G. Heraeus subsequently developed the production, sterilisation and test methods for the PALACOS® R+G bone cement and prepared the approval. Merck, as the pharmaceutical company, took care of the approval itself and started the distribution of the antibiotic-loaded bone cement for Heraeus in 1972.

How did the many publications on PALACOS® R+G have come about?

In addition to the development of new innovative products in the PMMA field, we continuously compared all competitive products in the market with PALACOS® R+G. For this purpose, we kept a laboratory journal and archived all formulations, methods and results. These observations promoted further cement development. In addition, the empirical values served as the basis for numerous scientific lectures worldwide and the first PMMA book "Bone Cements". Heraeus supported the publication of this data in order to highlight the outstanding position of PALACOS® in arthroplasty. At that time Heraeus Medical was hardly seen as the manufacturer and product owner of PALACOS® R+G, as the distribution was not in the hands of Heraeus. That is why we began to release scientific publications and gave lectures to professionals in order to make Heraeus more visible as a product expert and product owner of PALACOS® R+G in the market again. Our numerous publications and patents have successfully contributed to the fact that Heraeus Medical is today considered the "centre of excellence" in cemented arthroplasty.

You teach at the Medical University of Graz. What core message about PMMA bone cements and PALACOS® R+G do you convey to your students?

PMMA bone cement is now considered antiquated and hardly features in modern teaching. This is nonsensical and completely unjustified! In orthopaedic textbooks, one often searches in vain for the term PMMA bone cement. However, as soon as infections, revisions and multimorbid patients are involved, the use of PMMA bone cement is often indispensable. At the Medical University of Graz, both infections in arthroplasty and the material science properties of PMMA are taught.

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The role of PMMA bone cement as an ideal local carrier of an active ingredient is in the foreground here. As the gold standard, PALACOS® R and PALACOS® R+G play an outstanding prominent role in arthroplasty. During practical trainings at the University of Graz, PALACOS® bone cements are always used as reference products. The prospective surgeons are familiarised with the cement properties.

PALACOS® R+G writes 50 years of success story. How do you see the future of antibiotic-loaded bone cements?

Implant-associated infections will continue to be a challenge for patient care and science in the future. Infections are increasing, the germ spectrum is changing and more and more problem germs are being observed in clinical practice. The special adaptability of microorganisms requires ever new solutions to give patients safety and perspectives through targeted infection prophylaxis. In addition, patients are becoming younger and the number of revisions is constantly increasing. This increases the importance of PMMA bone cement as a local agent carrier, which must stabilise a prosthesis in the bone through ideal mechanical properties. In the future, it is to be expected that other pharmaceutical agents will be used to fight infection in addition to the broad-spectrum antibiotic Gentamicin. Research is currently being conducted on this. Smart combinations of active ingredients based on the excellent experience with PALACOS® R+G will continue to be indispensable in future prophylaxis and therapy. ■