Sectioning Scaffolds with ROWIAK TissueSurgeon: Multiple Materials for Versatile Applications in Cell Culture

Heiko Richter, ROWIAK GmbH, Hanover

Introduction

"Scaffolds" is a generic term for a group of porous materials used in cell culture, especially for implantation. In experimental designs, the penetration depth of a multi-layer cell culture into a scaffold has to be determined by histological sections. As most scaffold materials are very hard but also very brittle, common microtomy is impossible. Ground sections are very laborious and much material is lost. The Rowiak TissueSurgeon offers a new and easy way to produce serial sections of scaffolds without artifacts that appear in common microtomy.

Fig. 1: Scaffold HA in transmitted light (left) and phase contrast (right)

Material and Methods

Three different scaffold materials (HA, TCP g2 and cDMP) were embedded into Struers Epofix (Struers, Copenhagen, Denmark). Embedded samples were cut with a low speed saw equipped with a diamond blade (Buehler Isomet 1000, Düsseldorf, Germany) in adequate layer. Surfaces were mounted on a microscope slide with Technovit (Heraeus Kulzer, Hanau, Germany) and cured in UV light for at least 5 minutes. After curing process, samples were sectioned with Rowiak TissueSurgeon at 20 µm thicknesses and cover slipped with Histomount. The samples were documented with Zeiss Axioscope in transmitted light and phase contrast.

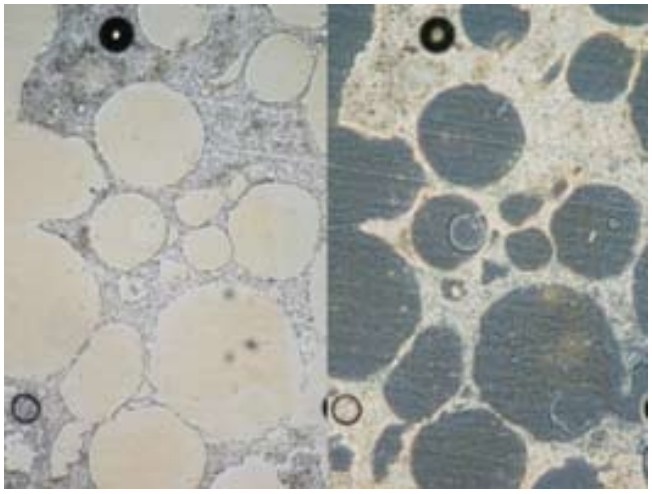

Fig. 2: Scaffold TCP g2 in transmitted light (left) and phase contrast (right)

Results

Samples from different material were sectioned with the Rowiak TissueSurgeon without well known artifacts that are known from common microtomy (Fig. 1-3). The sections were free of scratches or breaks and can be compared to polished surfaces known from ground sections.

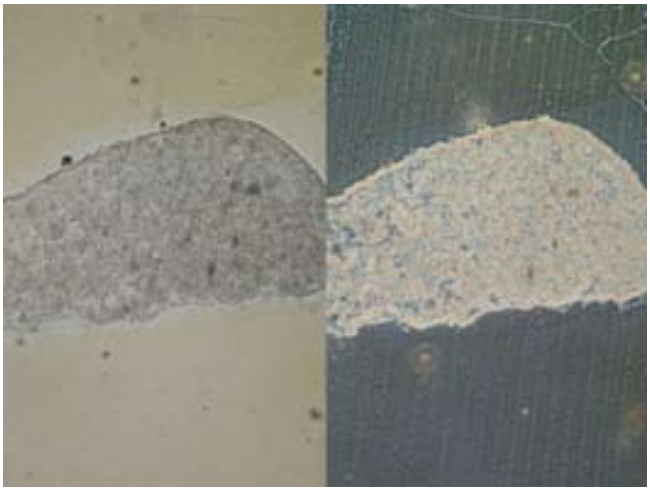

Fig. 3: Scaffold cDMP in transmitted light (left) and phase contrast (right)