The Cemented Hip Cup: The Weber Polyethylene-Ceramic and Metasul Cups and the High-Pressure Cementing Technique

B. G. Weber

Introduction

The total hip prosthesis (THP) can be said to fail as soon as it comes loose. With cemented anchorage [1, 2] there are two possible results: either immediate loosening, occurring as a consequence of faulty cementing technique, or immediate stability, as a result of good cementing technique. The subsequent fate of the prosthesis after immediate stability depends on possible factors of interference: (a) premature loosening resulting from infection, (b) late loosening following reaction of the tissues to polyethylene debris on the implant-bone interface as described by Willert [5], and (c) long-term stability lasting 30 years or more in the event of the absence of any significant wear, i. e., when the metal-metal pairing functions ideally [4].

Cup-Cementing Philosophy

Whether the cup "sits" well is determined during the operation (Fig. 1):

a) With many cups the cement runs out freely between the inserted cup and the acetabulum. In practice the cement undergoes no pressure. The bonding of the cement with the cup and with the bone is insufficient.

b) For the author’s own “earlet” cups frequently used even today, the situation is quite different: the earlets are positioned by trimming precisely into the entrance of the acetabulum and reduce the pass by which the excess cement runs out by about 50 %. In this way, when the cup is pressed into place, the cement is forced against the implant and the bone to the required degree.

c) The new Weber cup generation in use since 1987 is characterized by the cup fitting precisely into the reamed cavity in the pelvis, resembling the piston in the cylinder of a syringe. Pressure on the cup leads to the maximum possible bonding between cement, implant, and bone. The excess cement must, however, still be able to escape. For this reason there are cement run-out holes with a diameter of 2.5 mm in the rim of the cup. The cross-section for run-out is about 10 % of that described in Fig. 1a. The disadvantage is that the excess cement can be pressed out only by applying a great pressure, and particularly for larger cups.
Fig. 1a–c. Cement pressing and cup design. (a) Spherical cups without "hat rims." The cement does not undergo any real pressing, since it runs out unhindered when the cup is inserted (arrow). (b) The "earlet" cup (Weber). 1, The "earlets" on top prevent the cement from flowing away. There is a certain degree of pressing of the cement; 2, the cement can flow out only through the gaps between the "earlets" (arrows) and in this way undergoes pressing. (c) The Weber cup 1987. The "hat rim" is equipped with numerous cement run-out holes. Since the cup fits exactly in the reamed cavity in the acetabulum, the cement can run out only through the holes provided for this purpose (arrow). This achieves the best possible pressure on the cement.

the strength of the surgeon's own arms may not be sufficient for this. An instrument must therefore be available to help him.

**Weber Cups Since 1987**

The types of Weber cups available since 1987 include the following (Fig. 2):

a) Polyethylene cups for pairing with ball heads made of aluminium oxide ceramic, inside diameter 28 or 32 mm.