channel is molded in. This channel passes through the shaft and extends into the cap. On solidification, this channel will expand in the cap of the prosthesis and will shrink in the shaft thus reducing the shrinkage tension. It is customary to reinforce a prosthesis of this type if made from a synthetic material with a corrosion resistant metal rod (*c* in Figs. 1 and 2). When a channel is formed in the molding operation, it may receive the reinforcing rod *c*. The bottom portion *g* is later cast on or cemented on. The example of the invention shown in Fig. 2 may be produced by this technique.

Fig. 1 illustrates a method of locating a metallic insert as a reinforcing rod if the material is sufficiently plastic to allow for shrinkage tension. The reinforcing rod is inserted in the mold and supported at *e*. The synthetic material is injected and surrounds the reinforcing rod, forming a collar *f*. The supporting part of the rod is then severed at *m*. In a second molding operation the bottom end *g* is formed and joined to the collar *f*.

When the shaft is given a square-shaped section, I prefer to use a reinforcing rod of cross-shaped section which is positioned in such a way that the arms of the cross coincide with the diagonals of the square. With prostheses of the advanced design illustrated in Fig. 3, use of a reinforcing rod is no longer required, the cap being supported by the enclosed bone and the shaft being subject to tensile stresses only. According to this invention, the concave surface of the cap penetrates into the hemispherical portion as shown in Figs. 1 and 2. This causes the cap to be supported by the bone and bending moments in the shaft *b* are reduced.

Because of the relatively heavy section of the molded piece which forms the prosthesis, defects may occur which are not encountered in the usually thin walled products of the injection molding art. The material will show greater hardness and brittleness than the usual test rod of 4 mm. by 6 mm. section. Furthermore, bubbles may occur which are due to inclusion of gas or air. These originate either with the liquid synthetic material introduced from the injection cylinder or they are part of the air which originally filled the mold. According to the method of the invention, the properties of the synthetic material used are so adjusted that a test rod of the dimensions described above will appear rather soft so that it may be bent back upon itself without breaking.

This adjustment of properties may be achieved by physical or chemical mixing of different components. As an example of physical mixing, one may add to a hard synthetic material, such as polyurethane, a softer plastic material, such as a polyamide or polysebacyl hexamethylene diamide, in suitably fine dispersion. One may chemically adjust the mechanical properties of a synthetic material by co-polymerization or co-condensation. According to the method of the invention this is achieved by introducing a glycolic group into the synthetic molecule.

To avoid embrittlement, the synthetic material is molten continuously outside of the injection cylinder by means of large heating surfaces or by internal heating with warm inert gases. Thermal gradients are held to a minimum. The molten mass is then introduced into the injection cylinder preferably from above so as to permit escape of occluded gas particles. The cylinder is further heated sufficiently to maintain the temperature of the molten material.

The air is removed from the mold according to the method of the invention by a number of small cavities arranged along the parting surfaces outside of the mold proper so that the air may escape into these cavities during injection with little resistance. Air may also be removed from the mold by the application of vacuum.

I claim:

1. Alloplastic prosthesis for femoral head, comprising a substantially mushroom-shaped cap and a shaft, the underside of the cap being concave and being provided with radially extending rib-like formations, the shaft being provided with transversal ridges.

2. In the prosthesis according to claim 1, the periphery of the concave underside of the cap being provided with radially arranged ribs.

3. In the prosthesis according to claim 1, the cap having a peripheral rim, said rim being provided with serrations.

4. In the prosthesis according to claim 1, the cap having a peripheral rim, said rim being provided with pins.

5. The prosthesis according to claim 1, the cap having a peripheral rim, said rim being provided with protuberances, said protuberances being extended over the concave underside of the cap to follow the shaft and to form a shaft of star-shaped section.

6. In the prosthesis according to claim 1, the cap forming a shell, the underside of the cap being provided with radially arranged reinforcing ribs.

7. In the prosthesis according to claim 6, said ribs extending to follow the shaft and to form a shaft of star-shaped cross section.

8. The prosthesis according to claim 1, the shaft being provided with an axial channel, said channel extending about halfway through the body of the cap.

9. In the prosthesis according to claim 8, a metal rod being positioned in said channel, the free end of the rod carrying a member provided with transversal ridges.

10. The prosthesis according to claim 9, said ridges having a shape similar to several truncated cones located one on top of the other.

11. In the prosthesis according to claim 1, the shaft being provided with an axial channel, a metallic insert being provided in said channel, said insert having a cross section other than circular.

12. In the prosthesis according to claim 11, the shaft having a cross-sectional shape corresponding to the section of said insert.

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