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Seminars in
Arthroplasty

Cemented Femoral Fixation: Thin Mantles, The French Paradox

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A review of the results of 964 cemented stems has been performed with a 24-year follow-up. Three different stems were used, two being cobalt chrome and one a titanium alloy. The current stem has a modular neck to allow version change after cementation. The cementing technique is to ream lightly and trial with a stem large enough to give rotational resistance without cement. When cement is introduced, this large stem pressurizes the cement to completely fill the canal. Six cases only (0.6%) were revised for aseptic loosening. It is concluded that with this cement technique and with appropriate patient selection cement is still a reasonable option in the elderly with wide canals.

KEYWORDS total hip, cement, cemented stems

Noncemented femoral components are now widely used in North America and are increasingly being used worldwide. However, there is still a place for cemented stems, particularly in large diameter canals especially in the elderly with thin cortices. This avoids the possibility of end of stem pain due to modulus mismatch with a large canal-filling stem.

The standard cementing technique used in North America is to broach fairly heavily, use the broach as a trial, and downsize the real stem to produce a thick pure cement mantle. In some places in Europe, however, the technique is quite different. Reaming is fairly minimal, thus leaving a considerable amount of cancellous bone. A trial prosthesis is chosen that requires some degree of driving to fit it so that it is rotationally stable without cement. After trial the canal is plugged distally and water picked. A brush is not used, as it may remove excess cancellous bone. The cement is then pressure injected, filling from below, and pressurized and the stem is inserted.

The stem must be driven in, thus pressurizing the cement. The high pressure induced forces the cement through the cancellous bone to the endosteal cortex. This results in "white-out," ie, one cannot tell on x-ray where the cement ends and the cortical bone begins. This indicates that, while there is a small pure cement mantle, there is a thick cement/cancellous bone mantle.

The hip is rotationally stable so that there is no need to wait cement curing. The hip is simply reduced and closure begins, thus saving on average 12 minutes per case.

The author has been using this technique for 25 years and all cases have been followed prospectively. This report outlines the results achieved. Every case was done by the author.

Materials and Methods

There are three series. In series 1, the Xenophore Stem (Osteo AG, Zurich, Switzerland) was used. It was a cobalt chrome stem with three sizes and a thick 14/16 taper in some valgus with little offset. The trunion was of uniform length (Fig 1). It was used with a 32-mm ceramic head.

This stem was used between 1983 and 1985. There were 334 cases, 111 males and 223 females. The age range was 36 to 92 years (mean, 65 years). Twenty-four were over 80 years and four were over 90 years. Follow-up was 2 to 24 years. At more than 10 years, 133 cases were available; at more than 15 years, 73 cases were available, and, at more than 20 years, 38 cases were available for review.

With any long-term follow-up, especially with a mean starting age of 65 years, there will be severe patient drop off. Seventy-two had no further follow-up after 2 years, 54 of these were known to have died with the hip functioning. Of the remaining 262, 44 are known to have died with the implant functioning. Convention suggests that we have to assume that those lost to follow-up were revised elsewhere.

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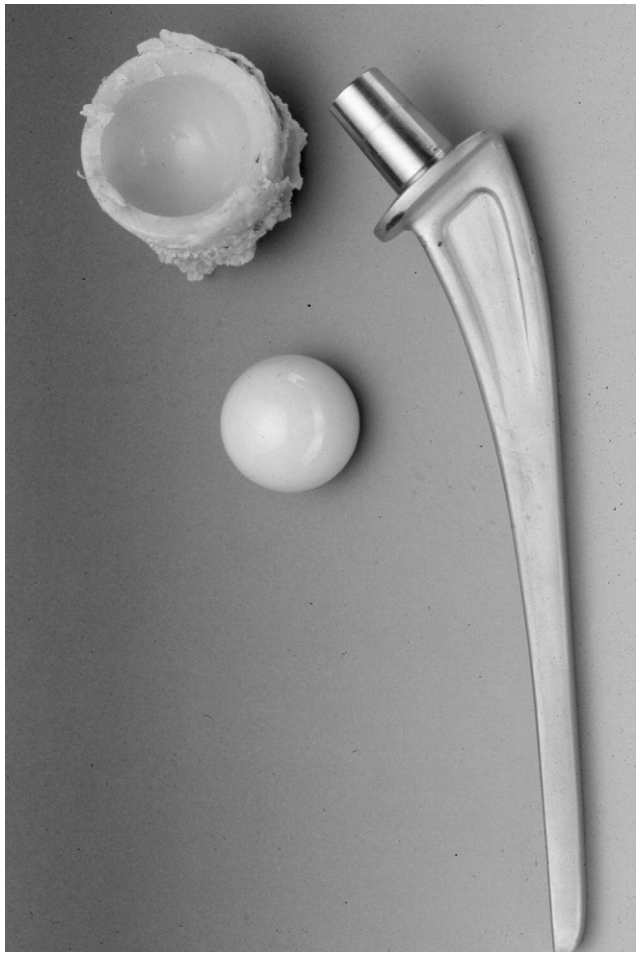

Figure 1 Xenophore stem.

However, in Canada, revisions are poorly reimbursed and it is therefore unlikely that any case was revised without my knowledge.

In series II, the International Hip Stem (Smith & Nephew, Memphis, TN) was used. This was a 6 aluminum, 4 vanadium titanium alloy that was satin finished. It resembled the Xenophore Stem but had a heavier shoulder to avoid any cycling, as titanium is inherently more flexible than cobalt chrome (Fig 2). There were five sizes, initially with a thick 14/16 taper but laterally with a thinned-down taper and less valgus. The taper was a uniform length. A 10/12 taper was also available in smaller sizes to take a 22-mm head. It was used initially with a 32 metal or ceramic head but laterally with the thinned-down neck a 28 metal head was used.

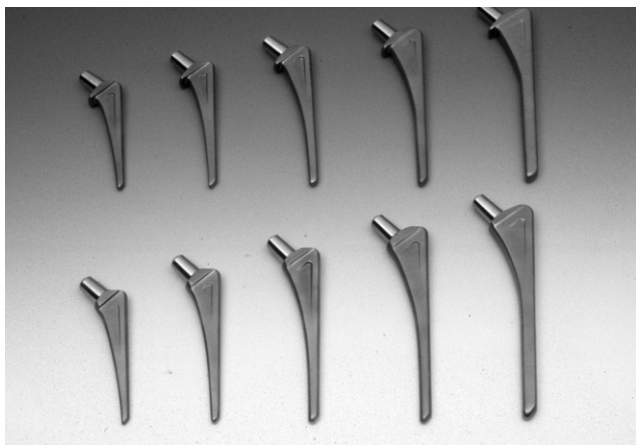

Figure 2 ITH titanium stem. The shoulder is bulky to prevent cycling.

Figure 3 The R120 stem with a modular neck.

This stem was used between 1985 and 2001. There were 680 cases of which 64 were bilateral. There were 257 males and 423 females. The age range was 35 to 92 years (mean, 69 years), with 91 being over 80 years and 21 over 85 years of age. One hundred fifteen were lost to follow-up under 2 years with 79 known to have died and 2 known to have emigrated. Follow-up was 2 to 22 years. Perioperative mortality was 4 (0.6%).

In series III, the R-120 Stem (Encore, Austin, TX) was used. There were five sizes. The distal half of the stem was highly polished and the proximal half was satin finished. The neck was modular with two male tapers on the neck fitting into the head and into the proximal stem (Fig 3). The neck/stem taper had 12 additional cogs to give greater rotational stability. The neck was 32 or 35 mm long and bent either 8 or 12°. The advantage of the modular neck on a cemented stem is that, inserted with the thin mantle technique, it is not possible to change stem version. The stem follows the canal. The modular neck enables adjustments in terms of version