

Sept. 20, 1955

H. G. VAN STEENBRUGGHE

2,718,228

ARTIFICIAL FEMORAL HEADS IN PROSTHESES

Filed Feb. 18, 1953

Fig.1

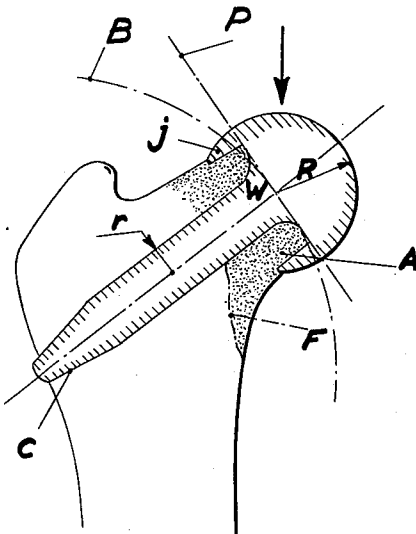


Fig.2

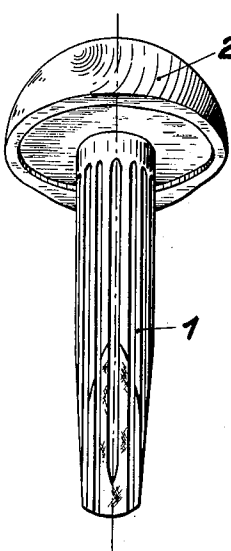


Fig.3

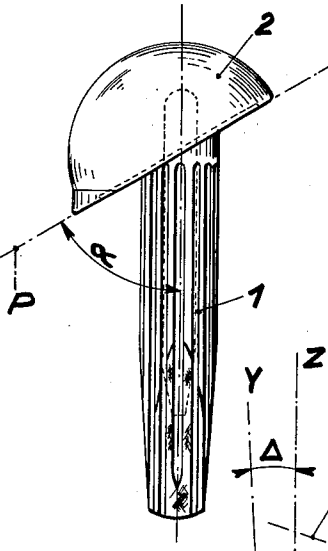
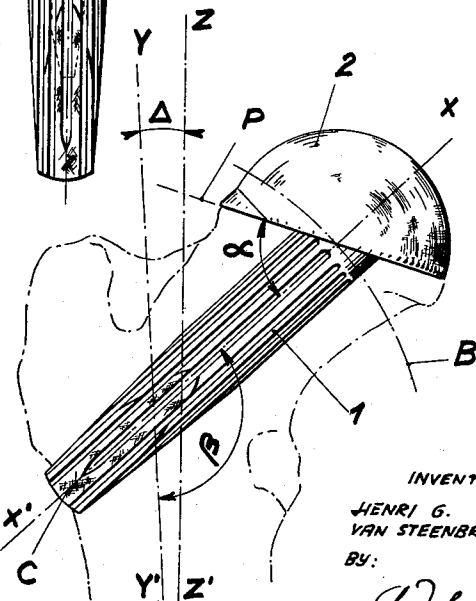


Fig.4



INVENTOR:
HENRI G.
VAN STEENBRUGGHE
BY:
A. John Michel
ATTORNEY

1

2,718,228

ARTIFICIAL FEMORAL HEADS IN PROSTHESES

Henri Georges Van Steenbrugge, Paris, France

Application February 18, 1953, Serial No. 337,596

Claims priority, application France September 26, 1952

2 Claims. (Cl. 128—92)

The present invention relates to improvements in artificial femoral heads.

For several years, surgeons have employed hemispherically shaped femoral prostheses in hip arthroplasty. The results thus obtained are often unsatisfactory, due mainly to the shape of said prostheses. These prior art prostheses have the following disadvantages (reference being had to Fig. 1 of the attached drawing for purposes of elucidation):

(a) Mechanically:

Since the radius R of the femoral head is larger than the radius of the stem r , a certain crank effect, due to frictional forces during walking, tends to cause said prostheses to turn around their longitudinal or stem axis.

The body weight of the patient is almost completely displaced onto the weaker part of the pivot toward the plane of impact of the prosthesis on the collar A . The prosthesis, having the end of its stem fastened into the subtrochanterian cortical C , has the tendency, under the above weight, to describe a circular arch B having its central point in the point of subtrochanterian support C . The plane P of the base of the femoral head can oppose said movement only by the resistance offered by the skirt portion J (this causing further anatomical difficulties), and by the pivot held in A .

(b) Anatomically:

For correctly inserting the prior art prostheses, it is necessary to ream a part of the femoral collar, this causing almost complete destruction of the collar cortical, said collar cortical being the densest and the most solid element of the bone. An inferior supporting point results thereby, and an excessive pressure on said surface, already weakened by the reaming operation, usually causing necrosis, i. e. destruction of the stronger bony supporting elements of said prosthesis; also, fractures of the lower lip or edge of the collar bone F have been observed. Further, by its construction, the skirt portion J of the prosthesis is necessarily fragile and breaks easily.

Finally, the fact that the bottom plane of the femoral head is perpendicular to the axis of the prosthesis forces the surgeon to unnecessarily sacrifice the lower extremity of the collar up to its junction with the femoral head.

The present invention has for one of its objects to provide a novel and economical shape to the femoral prostheses by abandoning the prior art angle of 90° between the plane P and the axis of the prosthesis, and by replacing it with an angle of about 60° ; this novel angulation causes a radical modification in the relation between the prosthesis and the bone, thereby eliminating the previously enumerated disadvantages and presenting the following added advantages:

(a) Mechanically:

Considerable increase in the supporting surface. The collar, instead of being cut perpendicularly to its axis, offers an oblique section having an elliptical surface much larger than the prior art circular surfaces.

A better distribution of pressures upon the increased surface and the prevention of rotation around the axis of

2

the prosthesis, due to the novel angle between said axis and the bottom plane of the femoral head. Since the plane P is no longer tangential to the arch B , said arch still having for its center the sub-trochanterian support point B , the dangers of the sinking of the femoral head and of an eventual bone fracture are eliminated, especially since the plane of support is almost horizontal with respect to the axis of the human body in erect position.

(b) Anatomically:

The cortex around the surface of section is completely preserved.

The lower edge of the femoral collar is completely preserved up to the supporting section.

Since the periosteum is neither carved nor covered by the skirt portion, nor is its upper part exposed to excessive pressures, the danger of necrosis is eliminated.

Finally, part W which is the most fragile part of the prior art prostheses, due to its position just below the lower plane of the femoral head, is no longer exposed to any abnormal pressures by said overhanging hemispherically shaped femoral head.

The invention will be more fully understood when described in conjunction with the attached drawing which is being presented only for illustrative purposes and in which:

Fig. 1 shows the shape and disposition of a prior art femoral head;

Figs. 2 and 3 show, respectively, an elevation and a left side view of a femoral head of this invention; and

Fig. 4 shows the arrangement on a femoral collar with an oblique supporting surface.

Referring now to the drawing, the novel femoral prosthesis which has been produced in conventional manner and from conventional materials, comprises a stem portion 1 and a hemispherical portion forming head 2, the lower plane P of said hemispherical head forming an angle α of about 60° with the axis of said stem.

The anatomical head of the femur is cut in such manner that the plane of this section forms an angle α of about 60° with axis XX' of the femoral collar (Fig. 4).

Under these conditions and by considering that the longitudinal axis YY' of the femur normally forms an angle β of about 130° with the axis XX' of the femoral collar, and that the plane supporting the base plane of the hemispherical head forms an angle α of about 60° with said axis XX' , it can be seen that the supporting surface is almost horizontal, taking into account the angle δ between the vertical ZZ' and axis YY' (said angle δ being changeable depending upon whether the patient is a man or a woman).

It is understood that the angle α between the base plane and the stem may differ from the above values, as long as same results are obtained.

I claim:

1. An artificial prosthesis consisting of a nearly hemispherical femoral head having a bottom wall and a substantially straight stem connected to the bottom wall of the hemispheric head, the angle enclosed by the plane of the bottom wall and the axis of the stem being different from a right angle.

2. An artificial prosthesis as defined in claim 1, wherein said angle is in the range of 60° .

OTHER REFERENCES

The Journal of Bone & Joint Surgery for January 1952, advertising page 4.

The Journal of Bone & Joint Surgery for July 1952, advertising page 51.

Copies of the above publications in the Scientific Library.