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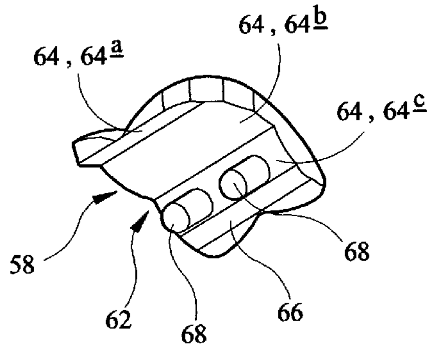

(57) Abstract: A talar component (58) comprises a superior surface profiled to receive a talar bearing, and a concave inferior surface (62). The inferior surface (62) has three planar contiguous surface portions (64a, 64b, 64c) which are angled relative to each other, and each surface portion (64a, 64b, 64c) extends across or substantially across a lateral extent of the talar component (58).

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IMPROVEMENTS IN AND RELATING TO AN ANKLE PROSTHESIS

The present invention relates to a talar component of an ankle prosthesis, an ankle resecting jig for a tibia and talus, and to a talus resecting jig for the anterior talus, as well as to methods of using the component and jigs.

Existing talar components for ankle prosthesis have been troublesome to introduce, typically comprising large block-shaped projections formed centrally on an inferior surface. The projection stabilises the talar component, but does require significant amounts of the talus to be removed to allow introduction.

The talar component of the present invention thus seeks to provide a solution to this problem, whereby stability is maintained, but introduction is simplified.

Heretobefore, it has been the responsibility of the surgeon to form angled surfaces on a talus. It is known to perform this simply by eye. This has resulted in trial and error resecting of the bone intraoperatively, and consequently an operation can take longer than anticipated while the correct angle to accept a talar component is formed.

The talar resecting jig of the present invention seeks to provide a solution to this problem.

Previously, it has also been solely down to the ability of a surgeon to judge an amount of bone to remove from both a distal end of a patient's tibia and a superior surface of the talus in order to accept an ankle prosthesis comprising a tibial component, a talar component and a bearing interposed therebetween. It is, however, important that ankle ligament tension is maintained to ensure that post-operative stability and function is optimised. If too much bone is removed, increased joint laxity may occur leading to potential instability and/or subluxation. If too little bone is removed, the joint would be tight and the range of motion may be compromised.

The ankle resecting jig of the present invention seeks to provide a solution to this problem, thus allowing an accurate amount of resection to occur so that correct ligament tension is maintained.

According to a first aspect of the invention, there is provided a talar component comprising a superior surface profiled to receive a talar bearing, and a concave inferior surface, the inferior surface having three planar contiguous surface portions which are angled relative to each other, and each surface portion extending across or substantially across a lateral extent of the talar component.

Preferable and/or optional features of the first aspect of the invention are set forth in claims 2 to 12, inclusive.

According to a second aspect of the invention, there is provided a method of introducing a talar component in accordance with the first aspect of the invention, the method comprising the steps of : a) resecting a talus of a patient to provide a superior surface of the talus with three contiguous surface portions angled relative to each other; and b) introducing the talar component onto the superior surface of the resected talus in an anterior to posterior direction of the patient, so that the three contiguous planar surface portions of the talar component seat on the three contiguous surface portions of the superior surface of the resected talus.

Preferable and/or optional features of the second aspect of the invention are set forth in claims 15 and 16.

According to a third aspect of the invention, there is provided an ankle resecting jig for an ankle prosthesis, the jig comprising a jig body directly or indirectly engagable with a patient, a spacer element which projects from the jig body for insertion between a distal end of a tibia of the patient and a superior surface of a talus of the patient to maintain ankle ligament tensions, and a cutting guide on the jig body for guiding the resection of the distal end of the tibia and the superior surface of the talus.

Preferable and/or optional features of the third aspect of the invention are set forth in claims 18 to 27, inclusive.

According to a fourth aspect of the invention, there is provided a method of balancing ankle ligaments during ankle prosthesis implantation, the method comprising the steps of : a) selecting a spacer element from amongst a plurality of spacer elements having different thicknesses, the selected spacer element fitting snugly between a distal end of a tibia of a patient and a superior surface of a talus of the patient so that the ankle ligaments maintain a correct tension; b) attaching a jig body of an ankle resecting jig to the patient so that the spacer element is held between the distal end of the tibia and the superior surface of the talus by the jig body; c) inserting a cutting device into a cutting guide of the jig body; and d) resecting the distal end of the tibia whilst being guided by the cutting guide, and resecting the superior surface of the talus whilst being guided by the cutting guide, so that a distance between resected surfaces corresponds to a working thickness of the assembled ankle prosthesis.

Preferable and/or optional features of the fourth aspect of the invention are set forth in claims 30 to 34, inclusive.

According to a fifth aspect of the invention, there is provided a talus resecting jig for forming a superior anterior surface on a talus at an angle to a longitudinal extent of a tibia, the jig comprising a support element for engagement with the tibia and/or the talus, and a guide element which is supported by the support element, the guide element extending at an angle to the support element and including a guide for a cutting device.

Preferable and/or optional features of the fifth aspect of the invention are set forth in claims 36 to 43, inclusive.

According to a sixth aspect of the invention, there is provided a method of forming a superior anterior surface on a talus at a non-perpendicular angle to a longitudinal extent of a tibia, the method comprising the steps of : a) attaching a support element of a talus resecting jig to a patient so that a guide element of the jig extends anteriorly and at an angle to the support element; b) locating at least part of a cutting device in a guide of the guide element; and c) operating the cutting device as the cutting device is moved along the guide, so that a superior anterior surface of the talus is resected at a non-perpendicular angle to a longitudinal extent of a tibia.

Preferable and/or optional features of the first aspect of the invention are set forth in claims 46 to 49, inclusive.

The invention will now be more particularly described, by way of example only, with reference to the accompanying drawings, in which :

Figure 1 is a perspective view of one embodiment of an ankle resecting jig, in accordance with the third aspect of the invention;

Figure 2 is an elevational view of one side of the jig shown in Figure 1, in the direction of arrow A;

Figure 3 is an elevational view of another side of the jig, shown in Figure 1, in the direction of arrow B;

Figure 4 is a perspective view of one embodiment of a talar resecting jig, in accordance with the fifth aspect of the invention and showing a head of a surgical cutting device located therein;

Figure 5 is a side elevational view of the jig shown in Figure 4, in the direction of arrow C;

Figure 6 is a side elevational view of the jig shown in Figure 4, in the direction of arrow D;

Figure 7 is a perspective view from above of one embodiment of a talar component, in accordance with the first aspect of the invention;

Figure 8 is a perspective view from below of the talar component;

Figure 9 is a side view of the talar component; and

Figure 10 is a view from the posterior edge of the talar component.

Referring firstly to Figures 1 to 3 of the drawings, there is shown an ankle resecting jig 10 for an ankle prosthesis, the jig comprising a jig body 12, a spacer element 14 which projects from the jig body 12, and a cutting guide 16 for receiving and guiding a cutting device (not shown).

Typical materials of the jig body are surgical grade stainless steels or high performance plastics and/or ceramics, and for the spacer element are Ultra High Weight Polyethylene or other suitable surgical plastics.

The jig body 12 is attachable at one end to a movable saddle 18 which, along with an elongate support element 20, forms part of a tibial guide 22. The saddle 18 forms part of two transverse adjustment mechanisms 24, 26, controlled via two rotatable control knobs 28, 30, respectively, which allow movement of the jig body 12 in two mutually perpendicular transverse directions normal to the longitudinal extent of the tibial guide 22.

Adjustment of the jig body 12 along the longitudinal extent of the elongate support element 20 of the tibial guide 22 is also possible. Typically, a ratchet mechanism or clamp mechanism is utilised.

The spacer element 14 is push-fit engagable with, and removable from, the jig body 12. The spacer element 14 has a predetermined thickness, and is selectable from a plurality of spacer elements 14 having differing thicknesses. The spacer element 14 is generally tongue shaped, and extends perpendicularly relative to the longitudinal extent of the tibial guide 22.

The cutting guide 16 includes two guide slots 32, 34, spaced in the longitudinal direction of the tibial guide 22, and positioned above and below the spacer element 14, respectively. The upper guide slot 32, in use nearest to the tibial guide 22, is a tibial slot for receiving a cutting device for resecting a distal end of a tibia, and the lower guide slot 32, in use furthest from the tibial guide 22, is a talus slot for receiving a cutting device for resecting a superior surface of a talus.

The tibial slot 32 and the talus slot 34 extend through the jig body 12 in parallel with each other, and in parallel with the spacer element 14. However, it is possible that the tibial slot and the talus slot need not be parallel, and/or the relative positioning of the two slots 32, 34 could be adjustable. In this latter case, one or both slots 32, 34 can have mechanically adjustable surfaces, as easily envisaged by one skilled in the field.

In use and with the ankle of the patient pre-prepared and at or substantially at 90 degrees to the tibia, the elongate support element 20 of the tibial guide 22 is pinned to the anterior surface of the patient's tibia, and the jig body 12, with selected spacer element 14, is aligned with the ankle joint via the adjustment mechanisms 24, 26 so that the spacer element 14 is interposed between the distal end of the tibia and the superior surface of the talus.

With the spacer element 14 interposed, the tension of the ankle ligaments is checked. If the ankle joint feels tight, then the spacer element 14 is too thick. The spacer element 14 is thus removed and replaced with a thinner spacer element 14. Conversely, if the ankle joint feels lax, then the spacer element 14 is replaced with one having a greater thickness.

The thickness of the spacer element 14 sets the distance between the distal end of the tibia and the superior surface of the talus.

Once the correct spacing of the tibia and the talus has been determined, via the spacer element 14, an oscillating saw or any other suitable cutting device can be inserted through the tibial slot 32, and the distal end of the tibia is resected by the correct amount to receive a tibial plate of a tibial component of an ankle prosthesis.

The oscillating saw or other cutting device is then inserted through the talus slot 34, and the superior surface of the patient's talus is resected by the correct amount to receive a talar plate of a talar component.

Once the talar component and the tibial component have been introduced and fixed in place, a sliding talar bearing is introduced between the tibial component and the talar component. A thickness of a talar plate of the talar component, a tibial plate of the tibial component, and the talar bearing matches or is close to a thickness of the selected spacer element 14 and the bone removed.

With the ankle prosthesis assembled and in place, a working thickness of the ankle prosthesis, being a distance between the tibial abutment surface of the tibial platform of the tibial component and a talar abutment surface of the talar platform of the talar component, thus corresponds to a correctly spaced distance between the resected surfaces of the tibia and the talus. Consequently, correct tension of the ligaments and thus correct mobility of the foot is restored.

It is feasible that the jig body can be attached to the patient's leg or foot by means other than a tibial guide, such as by a clamp or pins.

One or more spacer elements can be used to check spacing between the tibia and the talus prior to location of the jig body on the patient.

The spacer element can be a mechanical spacer device with moveable platforms or arms, instead of a plurality of interchangeable fixed-thickness devices. In this case, the spacer element can form part of or be permanently attached to the jig body.

The cutting guide can utilise only one slot. For example, the jig body could be invertible.

The slot or slots of the cutting guide may be dispensed with in favour of a guiding surface.

Referring now to Figures 4 to 6, there is shown a talus resecting jig 36 for forming a superior anterior surface on a talus at an angle to a longitudinal extent of a tibia, the jig comprising a support element 38, and a guide element 40 which is cranked relative to the support element 38.

Typical materials of the jig 36 are surgical grade stainless steels or high performance plastics and/or ceramics.

The support element 38 includes an interposable block-shaped portion 42, and a cranked arm portion 44 which extends at an angle from an upper anterior edge of the interposable portion 42. The guide element 40 extends perpendicularly or substantially perpendicularly from an edge of the arm portion 44 which is remote from the interposable portion 42, such that the guide element 40 forms an obtuse included angle with a plane of the inferior surface of the interposable portion 42. A general overall shape of the jig 36 is thus one of a dog-leg.

The guide element 40 includes a guide slot 46 which extends transversely, and preferably laterally, partway across the guide element 40. The guide slot 46 originates at one edge of the guide element 40, and terminates at a position spaced from an opposing side edge. As such, the guide slot 46 is spaced from, and extends in parallel or substantially parallel with, the anterior edge 48 of the guide element 40.

The guide slot 46 is suitably dimensioned to receive a shaft 50 of a rotatable cutting device 52, such as a surgical cutting reamer and/or /burr, or a specialised anterior talus cutter. As shown in the drawings, the cutter 52 has a rotatable shaft 50, a collar 54 defining a stop, and a rotatable grinding or cutting head 56.

The guide slot 46 is sufficiently spaced from the arm portion 44 so that, when the cutting device 52 is moved along the guide slot 46, the head 56 of the cutting device can travel parallel or substantially parallel to an inferior surface of the guide element 40 without hindrance or obstruction. If using the talus cutter, the collar 54 aids location. Although, in the present case, the collar 54 is fixed, the collar can be movable axially along the shaft to bear on a surface of the arm portion to help maintain the cutting head 56 in place.

The following description of the in use talus resecting jig 36 assumes that the foot of the patient has no or substantially no flexion, and thus extends at or substantially at right angles to the tibia.

Once a superior surface of a patient's talus has been resected normally to a longitudinal extent of the tibia, for example, through the use of the ankle resecting jig 10 described above, the talus resecting jig 36 is used to form an angled superior anterior surface on the talus in readiness for accepting a talar component of an ankle prosthesis, and to therefore correctly position the implant in the anterior/posterior plane.

To this end, the interposable portion 42 of the support element 38 is located between a distal end of the tibia and a previously resected normal superior surface of the talus, and is releasably attached, via the inferior surface, to the resected normal superior surface of the talus, typically by pinning or screwing, so that the guide element 40 projects anteriorly and inferiorly. The spacing of the guide slot 46 from the anterior surface of the talus is selected by the use of a spacer (not shown). A thickness of the spacer is generally based on a preselected talus component to be used. The spacer may simply be a cutting head 56 of the cutting device.

With the jig 36 in place, a size of cutting head 56 is selected, based on the talus component to be inserted. A shaft 50 of the rotatable cutting device 52 is located in the guide slot 46, and the cutting head 56 is received between the talus and the guide element 40. The cutting device is then operated whilst moving the shaft 50 back and forth along the guide slot 46.

The orientation of the guide slot 46 causes the cutting device 52 to be guided laterally relative to the foot of the patient and, due to the angle of the guide element 40, and thus the consequential angle of attack of the cutting head 56, an angled superior anterior surface is formed on the talus contiguously with the previously formed normal superior surface. The angled superior anterior surface thus forms an obtuse included angle with a longitudinal extent of the tibia. Since the talus component to be inserted is known, the posterior surface can be extremely accurately cut using a posterior talus resecting jig , due to the accurately cut anterior surface.

The talus is thus ready to receive a complementarily angled inferior surface of a talar component with optimum placement in the anterior/posterior direction or sagittal plane.

Although the block-shaped interposable portion 42 is beneficial for maintaining a spacing between the distal end of the tibia and the superior surface of the talus, the interposable portion can be a plate instead of a block.

Furthermore, the interposable portion can be dispensed with altogether. In this case, the support element is directly attached to the patient's foot at a position which is spaced or remote from the resected normal superior surface of the talus. For example, the support element can be attached to the patient's foot anteriorly or laterally of the guide element. Additionally or alternatively, it is further envisaged that the support element can be attached, either directly or indirectly, to the patient's tibia.

Although the talus resecting jig is formed integrally as a single one-piece device, it can be formed from two or more parts. For example, a removable guide element, thus enabling selection of a guide element with a differently spaced or orientated guide slot, would enable different sizes of cutting head to be utilised, or the jig to more readily accommodate a different size of talus.

The guide slot of the guide element can extend from either side of the guide element, and it is also envisaged that the guide slot could extend from an edge of the guide element which extends transversely to the side edge.

Referring now to Figures 8 to 10, there is shown a talar component 58 for an ankle prosthesis, the talar component 58 comprising a superior bearing surface 60 with an articular profile for seating a complimentarily-shaped mobile talar bearing (not shown), and a concave multi-faceted inferior surface 62.

The shape of the superior surface 60 is well known, and thus will not be described in any particular detail.

The inferior surface 62 has three planar talus contacting surface portions 64 formed contiguously in an anterior to posterior direction. Each surface portion 64 has a minor dimension which extends in the anterior to posterior direction of the talar component 58, and a major dimension which is greater than the minor dimension and which extends across or substantially across the lateral extent of the talar component 58, normal to the anterior-posterior direction.

The longitudinal extents of the surface portions 64 extend in parallel or substantially parallel with each other in the lateral direction of the talar component 58.

The posterior surface portion 64a forms an obtuse included angle, typically in the range of 140^0 to 160^0 and preferably 150^0, with the middle surface portion 64b in an anterior/posterior direction of the talar component 58, so that, with the middle surface portion 64b horizontal or substantially horizontal, the posterior surface portion 64a extends inferiorly or downwards. This angle allows easy resection of the posterior slope through the joint gap and permits a relatively thin bearing to be used without loss of excessive bone stock.

The anterior surface portion 64c also forms an obtuse included angle, typically in the range of 125^0 to 145^0 and preferably 135^0, with the middle surface portion 64b in an anterior/posterior direction of the talar component 58, so that, with the middle surface portion 64b again horizontal or substantially horizontal, the anterior surface portion 64c extends inferiorly or downwards.

An anterior edge of the talar component 58 includes a laterally-extending radiused portion 66 which blends into the anterior surface portion 64c.

Two wedging bollards 68 are integrally formed on the anterior surface portion 64c. The bollards 68 are aligned in spaced parallel relationship in the lateral direction of the anterior surface portion 64c, and are spaced inwardly from side edges of the talar component 58. Each bollard 68 is around 10 millimetres in length and projects from the anterior surface portion 64c in a direction from the superior surface to the inferior surface of the talar component 58.

Each bollard 68 is cylindrical or substantially cylindrical, and has a longitudinal extent which is normal or substantially normal to the plane of the anterior surface portion 64c. The longitudinal extent of each bollard 68 is perpendicular to the anterior surface portion 64c, and the longitudinal extent in a proximal to distal direction of each bollard 68 thus diverges relative to a plane of the posterior surface portion 64a.

The talar component 58 is formed from any suitable bio-compatible material, such as cobalt chrome, stainless steel, or titanium alloy. The superior surface typically includes a titanium nitride coating or other suitable coating to increase hardness and to reduce third body abrasion. The inferior surface 62 of the talar component 58 is coated with hydroxyapatite, calcium phosphate, or any other suitable oestoconductive material, to promote bony ongrowth and long term stability.

To introduce the talar component 58 onto a talus of a patient, a superior surface of the talus is first resected. With the patient's foot in a condition with no flexion, and thus at or substantially at right angles to the longitudinal extent of the tibia, the talus is resected to provide a first surface which is normal or substantially normal to the longitudinal extent of the tibia. This normal resected surface corresponds to the middle surface portion 64b of the talar component 58, and this resection can be accomplished in a straightforward manner by, for example, using the ankle jig 10 described above.

To provide an anterior angled surface on the talus, which is contiguous with the normal resected surface and which corresponds to the anterior surface portion 64c of the talar component 58, the talus resecting jig 36 described above can be conveniently utilised. An alternative is for the surgeon to undertake the resection by eye and trial-and-error, although this is not preferable.

A posterior angled surface on the talus, which is typically contiguous with the normal resected surface and which corresponds to the posterior surface portion 64a of the talar component 58, is formed by the surgeon using the posterior talus resecting jig

A trial talar component without bollards can be utilised to check the conformance of the seating of the multi-faceted inferior surface on the multi-faceted resected superior surface of the talus. Once satisfied that the talar component seats snugly on the resected talus, complimentary holes to receive the bollards are formed.

The talar component 58 is then fed onto the resected talus surface in an anterior to posterior direction, and the bollards 68 are located in their respective holes.

Due to the longitudinal extent of the wedging bollards 68 diverging from the plane of the posterior surface portion 64a of the talar component 58, wedging engagement of the talar component 58 with the resected talus is achieved, thus significantly increasing stability and engagement of the talar component 58 on the patient's talus.

Although the bollards extend in parallel with each other, they can converge or diverge to increase the wedging engagement.

The bollards are generally pin shaped, but can be of any suitable shape. For example, the bollards can be fully or partially frusto-conical, or have a non-circular lateral cross-section, such as square, rectangular or polygonal.

It is suggested that two bollards are provided. The bollards promote stability, particularly in a lateral direction of the talar component. However, one bollard or more than two bollards can be provided. The or each bollard acts as a stabilisation keel or element, as well as promoting greater fixation due to the wedging action achieved in conjunction with the posterior surface portion. Thus, providing these functions are achieved, the bollards can be block-shaped or any other suitable shape.

Although the or each bollard is preferably provided on the anterior surface portion of the inferior surface of the talar component, it is envisaged that one or more of the bollards can be provided on any one of the surface portions of the inferior surface, or on more than one of the surface portions of the inferior surface portions.

Furthermore, although preferably three contiguous planar surface portions are described, more than three contiguous planar surface portions which extend consecutively in an anterior to posterior direction and/or a lateral direction of the component can be provided.

It is thus possible to provide an ankle resecting jig for an ankle prosthesis which allows accurate resection of the tibia and the talus, whereby correct tension of the ankle ligaments is maintained. It is also possible to provide a method of balancing ankle ligaments during ankle prosthesis implantation, preferably by use of the aforementioned ankle resecting jig.

It is further possible to provide a talus resecting jig which simplifies the formation of a superior anterior surface on a talus at an angle to a longitudinal extent of a patient's tibia. A method of forming a superior anterior surface on a talus of a patient at a non-perpendicular angle to the longitudinal extent of the tibia is also provided. The method conveniently utilises the aforementioned talus resecting jig.

It is also possible to provide a talar component for an ankle prosthesis which provides increased stabilisation through the use of a multi-faceted inferior surface. The use of wedging bollards also advantageously permits increased fixation through wedging engagement with the talus.

The embodiments described above are given by way of examples only, and various other modifications will be apparent to persons skilled in the art without departing from the scope of the invention, as defined by the appended claims.

CLAIMS

1. A talar component 58 comprising a superior surface profiled to receive a talar bearing, and a concave inferior surface 62, the inferior surface 62 having three planar contiguous surface portions 64 which are angled relative to each other, and each surface portion 64 extending across or substantially across a lateral extent of the talar component 58.
2. A talar component as claimed in claim 1, wherein the three contiguous surface portions 64 extend consecutively in an anterior to posterior direction of the component.
3. A talar component as claimed in claim 1 or claim 2, wherein the included angle between adjacent surface portions 64 is obtuse.
4. A talar component as claimed in any one of the preceding claims, further comprising one or more wedging stabilisation elements extending from one or more of the surface portions 64 in a direction from the superior surface to the inferior surface 62.
5. A talar component as claimed in claim 4, wherein the or each stabilisation element extends from an anterior said surface portion 64 which is at or closest to the anterior edge of the component.
6. A talar component as claimed in claim 4 or claim 5, wherein the or each stabilisation element is an elongate bollard 68.
7. A talar component as claimed in any one of claims 4 to 6, wherein a longitudinal extent in a proximal to distal direction of the or each stabilisation element diverges relative to a posterior said surface portion 64 which is at or closest to the posterior edge of the component.
8. A talar component as claimed in any one of claims 4 to 7, wherein the or each said stabilisation element has a uniform lateral cross-section along a majority of its longitudinal extent.
9. A talar component as claimed in any one of claims 4 to 8, wherein two said stabilisation elements are provided in spaced parallel relationship
10. A talar component as claimed in claim 9, wherein the said stabilisation elements are spaced in a lateral direction of the component.

11. A talar component as claimed in any one of claims 4 to 10, wherein the or each stabilisation element is in the form of a pin.

12. A talar component as claimed in any one of the preceding claims, wherein the inferior surface 62 includes an oesteoconductive coating.

13. A talar component substantially as hereinbefore described with reference to Figures 7 to 10 of the accompanying drawings.

14. A method of introducing a talar component 58 as claimed in any one of the preceding claims, the method comprising the steps of : a) resecting a talus of a patient to provide a superior surface of the talus with three contiguous surface portions 64 angled relative to each other; and b) introducing the talar component 58 onto the superior surface of the resected talus in an anterior to posterior direction of the patient, so that the three contiguous planar surface portions 64 of the talar component 58 seat on the three contiguous surface portions 64 of the superior surface of the resected talus.

15. A method as claimed in claim 14, wherein, when the talar component 58 includes one or more wedging stabilisation elements extending from one or more of the surface portions 64 in a direction from the superior surface to the inferior surface 62, a step c) is provided between steps a) and b) of forming one or more complimentary holes in one of the said contiguous surface portions 64 of the resected talus, and in step b) further locating the or each stabilisation element in the or each corresponding hole as the talar component 58 is introduced.

16. A method as claimed in claim 15, wherein, when the or each stabilisation element extends from the said anterior surface portion 64c of the talar component 58, and a longitudinal extent in a proximal to distal direction of the or each stabilisation element diverges relative to the said posterior surface portion 64a of the talar component 58, in step b) wedging engagement of the talar component 58 on the resected talus is achieved when the or each stabilisation element is received in the or each corresponding hole and when the posterior surface portion 64a of the talar component 58 is seated on a corresponding posterior surface portion 64a of the resected talus.

17. An ankle resecting jig for an ankle prosthesis, the jig 10 comprising a jig body 12 directly or indirectly engagable with a patient, a spacer element 14 which projects from the jig body 12 for insertion between a distal end of a tibia of the patient and a superior surface of a talus of the patient to maintain ankle ligament tensions, and a cutting guide 16 on the jig body 12 for guiding the resection of the distal end of the tibia and the superior surface of the talus.
18. An ankle resecting jig as claimed in claim 17, wherein the spacer element 14 is removably engaged with the jig body 12.
19. An ankle resecting jig as claimed in claim 17 or claim 18, wherein a distance between upper and lower surfaces of the spacer element 14 is selectable.
20. An ankle resecting jig as claimed in any one of claims 17 to 19, wherein the spacer element 14 is selectable from amongst a plurality of spacer elements of varying thickness.
21. An ankle resecting jig as claimed in any one of claims 17 to 20, wherein the cutting guide 16 comprises a tibial slot 32 for receiving a cutting device for resecting the distal end of the tibia, and a talus slot 34 for receiving a cutting device for resecting the superior surface of the talus.
22. An ankle resecting jig as claimed in claim 21, wherein the tibial slot 32 and the talus slot 34 are spaced from each other with the spacer element 14 interposed therebetween.
23. An ankle resecting jig as claimed in claim 21 or claim 22, wherein the tibial slot 32 and the talus slot 34 extend in parallel with each other through the jig body 12.
24. An ankle resecting jig as claimed in any one of claims 17 to 23, further comprising an elongate tibial guide 22 for attachment to an anterior surface of the tibia of the patient, the jig body 12 being adjustably engagable with the tibial guide 22.
25. An ankle resecting jig as claimed in claim 24, wherein the jig body 12 includes a longitudinal adjustment mechanism by which the jig body 12 can be moved along the longitudinal extent of the tibial guide 22.

26. An ankle resecting jig as claimed in claim 24 or claim 25, wherein the jig body 12 includes a transverse adjustment mechanism by which the jig body 12 can be moved transversely relative to the longitudinal extent of the tibial guide 22.

27. An ankle resecting jig as claimed in claim 26, wherein the transverse adjustment mechanism allows adjustment in two directions normal to each other.

28. An ankle resecting jig substantially as hereinbefore described with reference to Figures 1 to 3 of the accompanying drawings.

29. A method of balancing ankle ligaments during ankle prosthesis implantation, the method comprising the steps of : a) selecting a spacer element 14 from amongst a plurality of spacer elements 14 having different thicknesses, the selected spacer element 14 fitting snugly between a distal end of a tibia of a patient and a superior surface of a talus of the patient so that the ankle ligaments maintain a correct tension; b) attaching a jig body 12 of an ankle resecting jig 10 to the patient so that the spacer element 14 is held between the distal end of the tibia and the superior surface of the talus by the jig body 12; c) inserting a cutting device into a cutting guide 16 of the jig body 12; and d) resecting the distal end of the tibia whilst being guided by the cutting guide 16, and resecting the superior surface of the talus whilst being guided by the cutting guide 16, so that a distance between resected surfaces corresponds to a working thickness of the assembled ankle prosthesis.

30. A method as claimed in claim 29, wherein, in step a), the spacer element 14 is separate of or separable from the jig body 12.

31. A method as claimed in claim 29 or claim 30, wherein, in step b), the jig body 12 is attached to an anterior surface of the tibia and/or talus of the patient via an elongate tibial guide 22.

32. A method as claimed in claim 31, wherein, once attached, a position of the jig body 12 is adjusted via adjustment mechanisms to align the spacer element 14 between the tibia and the talus.

33. A method as claimed in any one of claims 29 to 31, wherein, in step c), the cutting guide 16 includes a tibial slot 32 and a talus slot 34, the cutting device being initially inserted into one of the tibial slot 32 and the talus slot 34, and,

following resection, being inserted into the other one of the tibial slot 32 and the talus slot 34.

34. A method as claimed in any one of claims 29 to 33, further comprising a step e), subsequent to step d), of introducing a talar component 58 to a resected superior surface of the talus, a tibial component to a resected distal end of the tibia, and a sliding bearing interposed between the talar component 58 and the tibial component.

35. A talus resecting jig 36 for forming a superior anterior surface on a talus at an angle to a longitudinal extent of a tibia, the jig comprising a support element 38 for engagement with the tibia and/or the talus, and a guide element 40 which is supported by the support element 38, the guide element 40 extending at an angle to the support element 38 and including a guide for a cutting device.

36. A talus resecting jig as claimed in claim 35, wherein the support element 38 has an inferior surface 62, and the guide element 40 forms an obtuse included angle with a plane of the inferior surface 62.

37. A talus resecting jig as claimed in claim 35 or claim 36, wherein the support element 38 includes an interposable portion 42 for location between a distal end of the tibia and a superior surface of the talus.

38. A talus resecting jig as claimed in claim 37, wherein the support element 38 further includes an arm portion 44 which extends from the interposable portion 42, the guide element 40 being provided at an end of the arm portion 44 remote from the interposable portion 42.

39. A talus resecting jig as claimed in claim 38, wherein the guide element 40 extends normal or substantially normal to the arm portion 44.

40. A talus resecting jig as claimed in any one of claims 35 to 39, wherein the guide element 40 is cranked relative to the support element 38.

41. A talus resecting jig as claimed in any one of claims 35 to 40, wherein the jig is dog-leg shaped.

42. A talus resecting jig as claimed in any one of claims 35 to 41, wherein the guide extends transversely across at least part of the guide element 40.

43. A talus resecting jig as claimed in any one of claims 35 to 42, wherein the guide is a slot having an opening formed in a side edge of the guide element 40.

44. A talus resecting jig substantially as hereinbefore described with reference to Figures 4 to 6 of the accompanying drawings.

45. A method of forming a superior anterior surface on a talus at a non-perpendicular angle to a longitudinal extent of a tibia, the method comprising the steps of : a) attaching a support element 38 of a talus resecting jig 36 to a patient so that a guide element 40 of the jig extends anteriorly and at an angle to the support element 38; b) locating at least part of a cutting device in a guide of the guide element 40; and c) operating the cutting device as the cutting device is moved along the guide, so that a superior anterior surface of the talus is resected at a non-perpendicular angle to a longitudinal extent of a tibia.

46. A method as claimed in claim 45, wherein, in step a), the support element 38 is located between a distal end of the tibia and a superior surface of the talus.

47. A method as claimed in claim 45 or claim 46, wherein, in step c), the guide extends laterally to a longitudinal extent of the tibia, so that the cutting device is directed laterally when located in the guide.

48. A method as claimed in any one of claims 45 to 47, wherein the guide element 40 is spaced from the talus, so that a head of the cutting device can move beneath the guide element 40.

49. A method as claimed in any one of claims 45 to 48, wherein the talus is positioned at or substantially at right angles to the tibia, and the guide element 40 is angled so that the cutting device forms a superior anterior resected surface on the talus which, with the longitudinal extent of the tibia, provides an obtuse included angle.

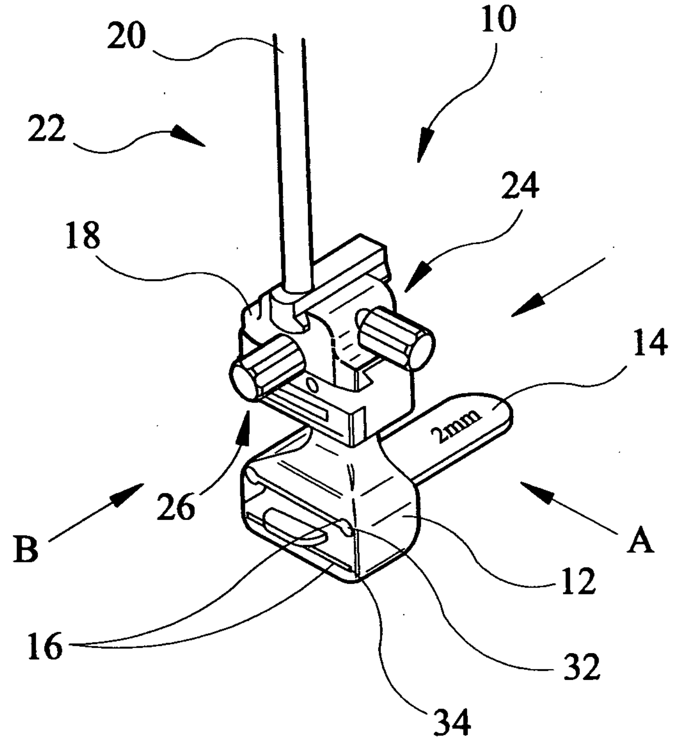

FIG 1

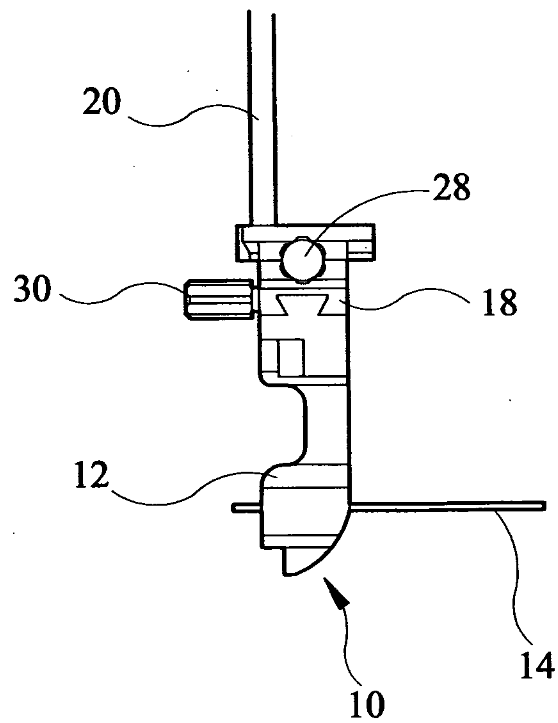

FIG 2

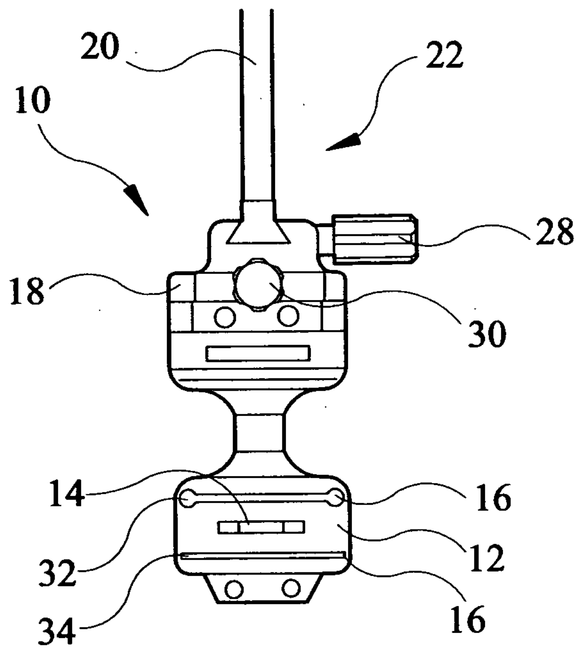

FIG 3

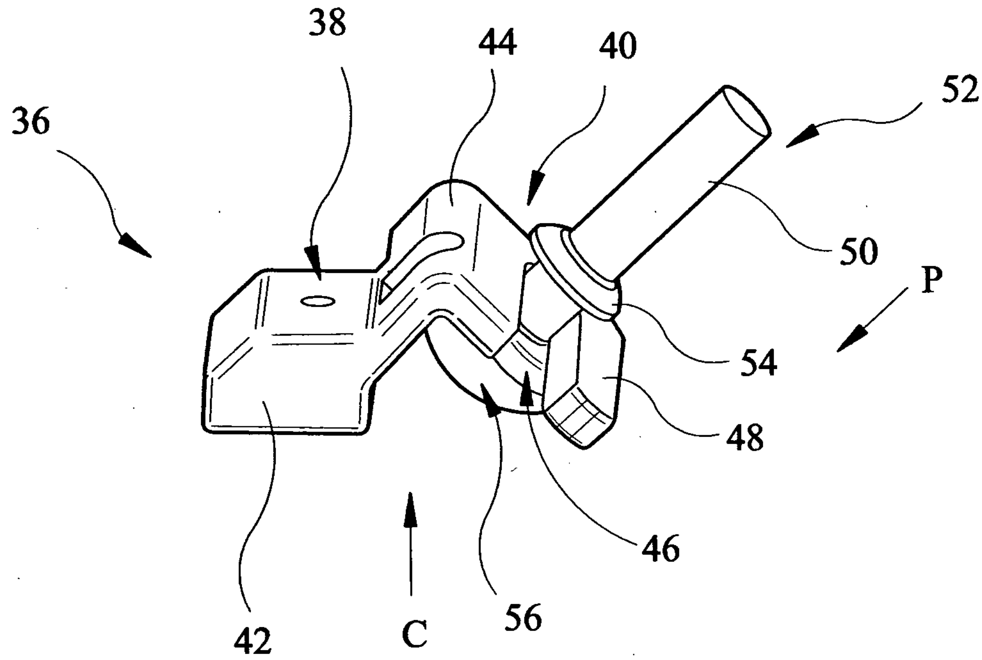

FIG 4

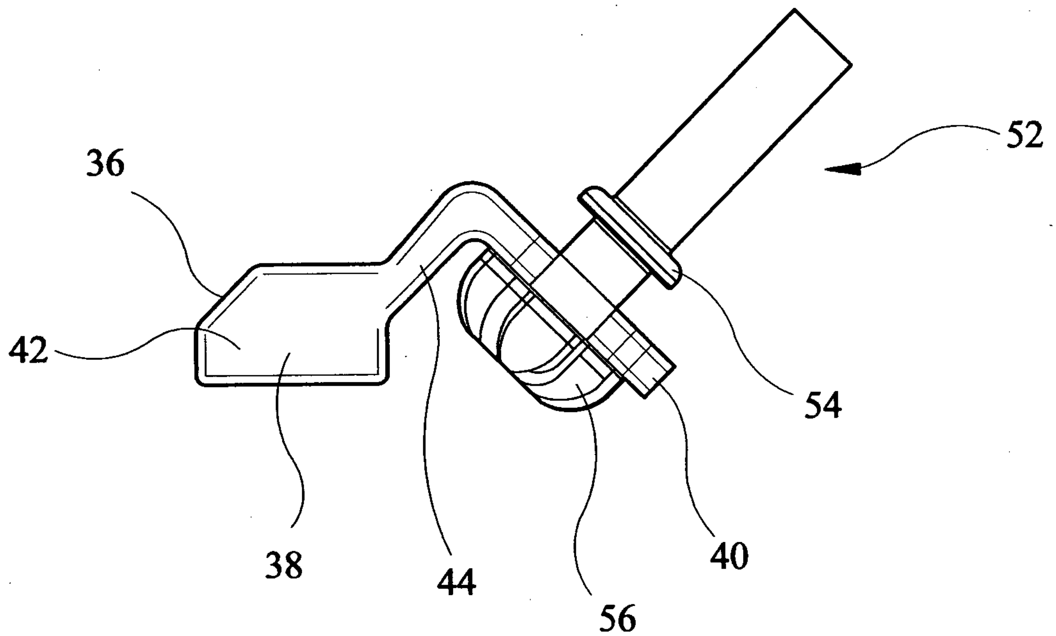

FIG 5

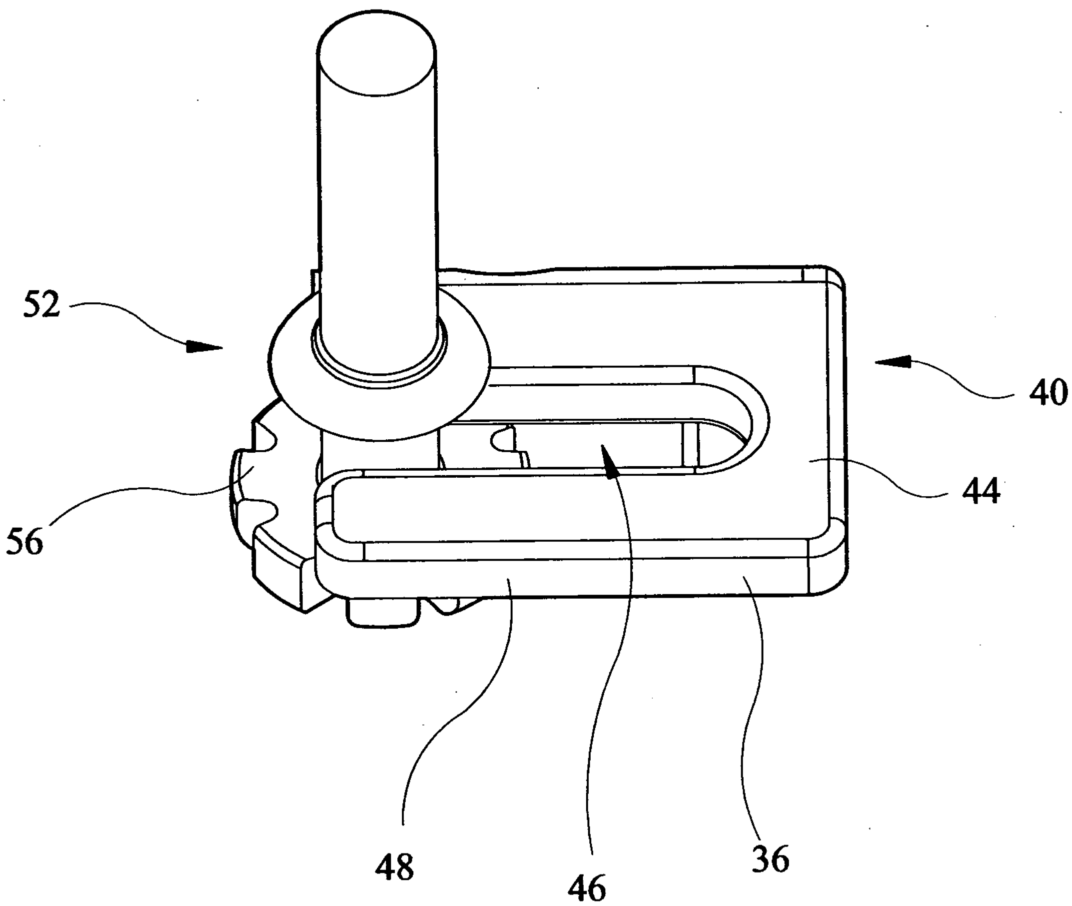

FIG 6

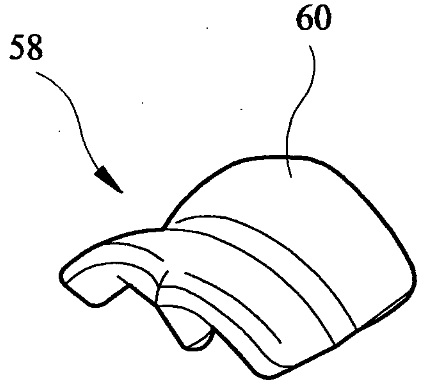

FIG 7

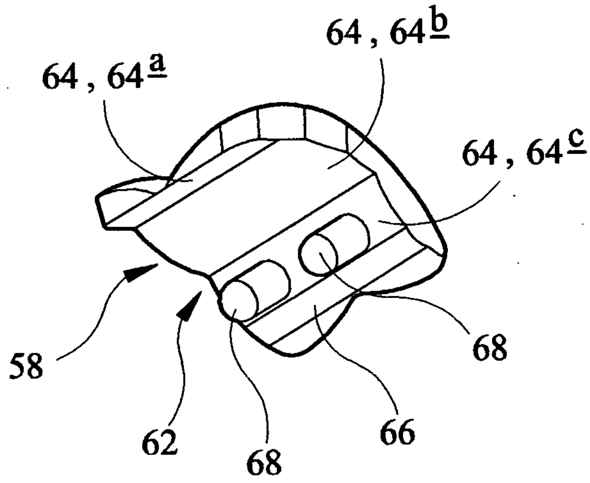

FIG 8

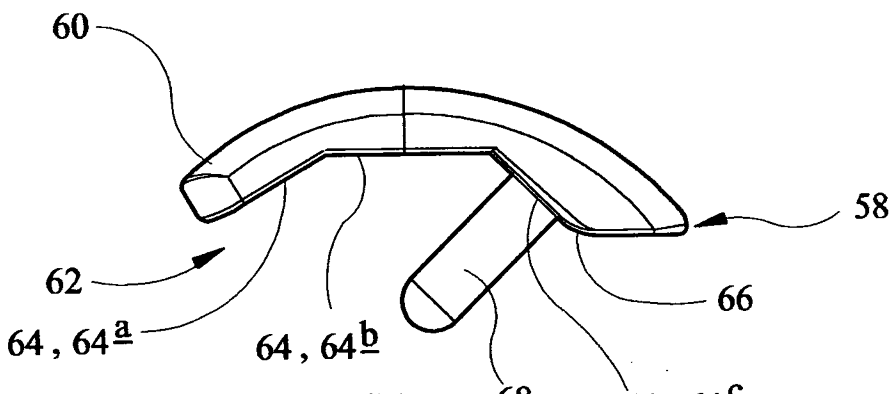

FIG 9

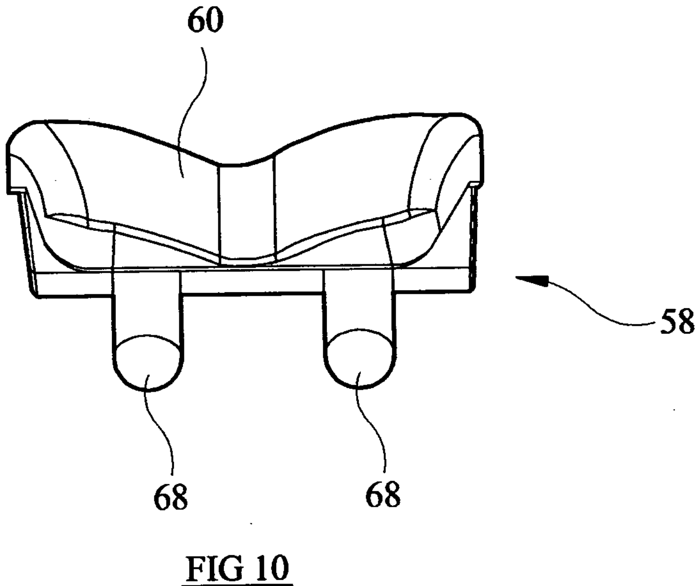

FIG 10