

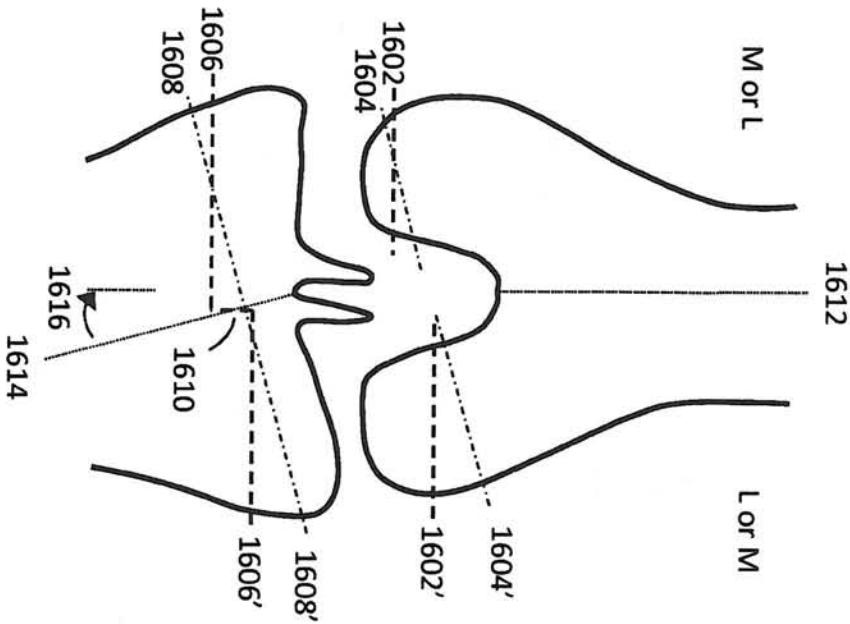
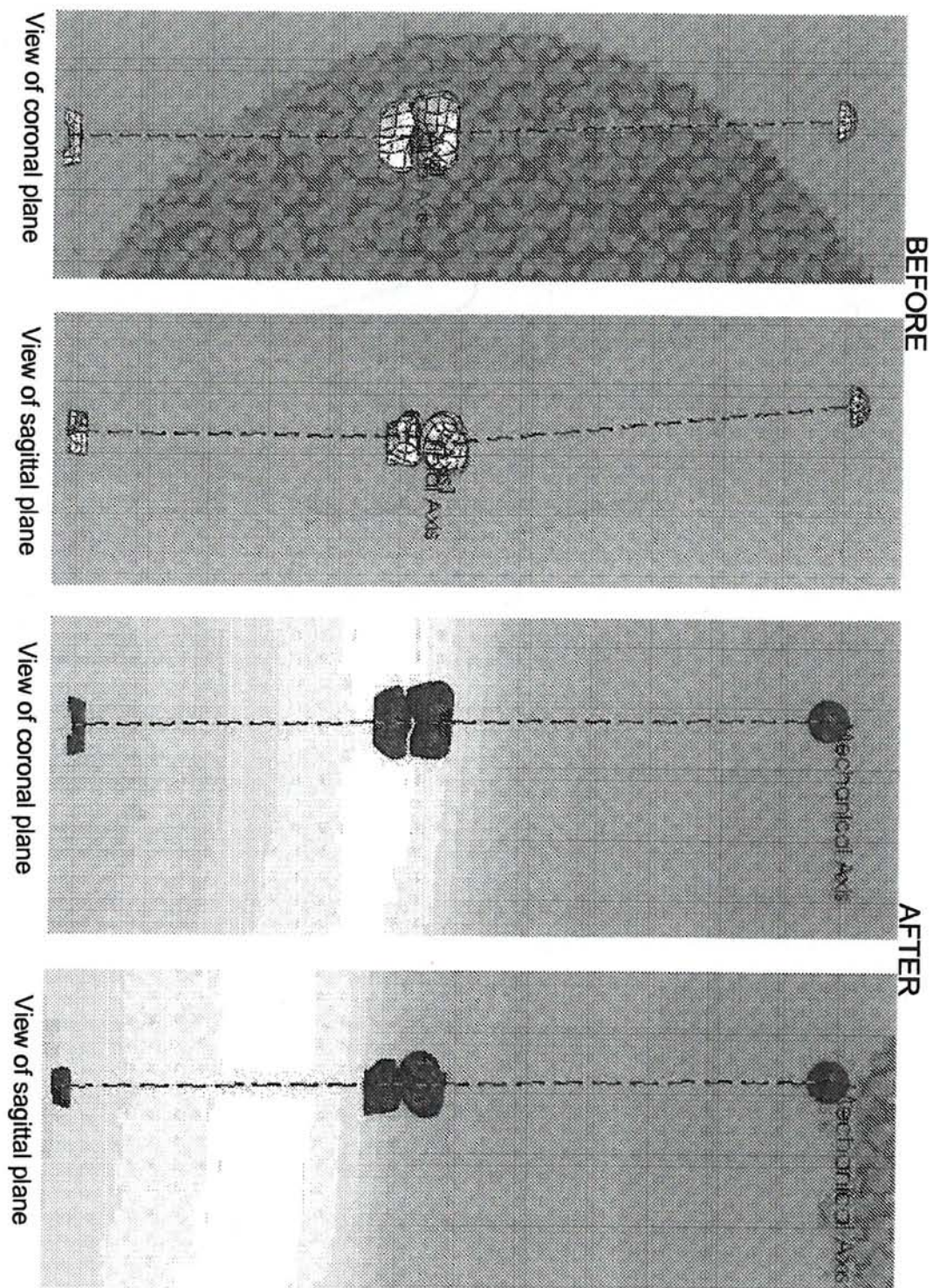


FIG. 1



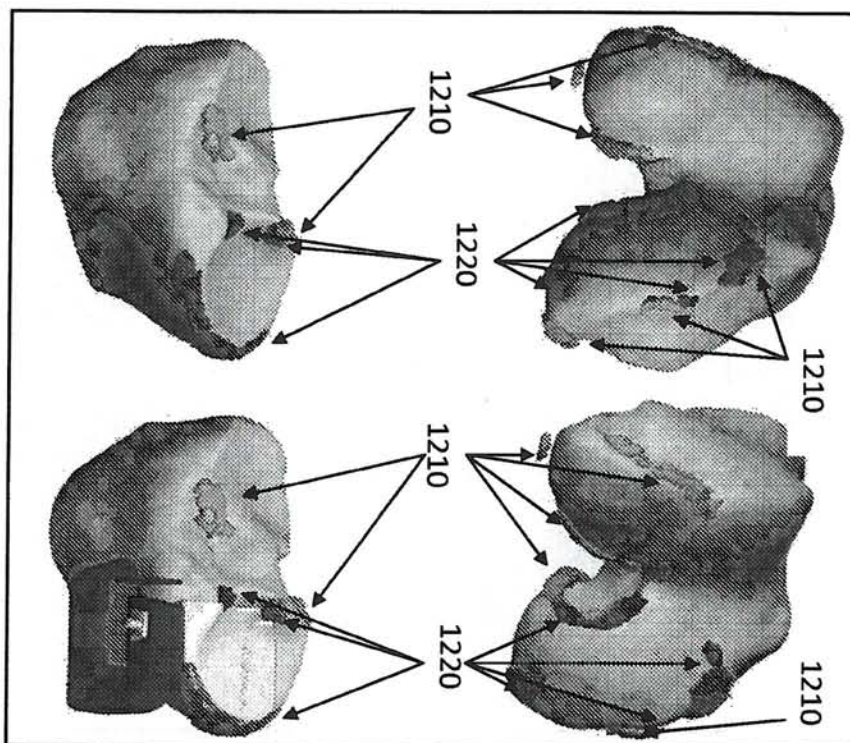


FIG. 3A

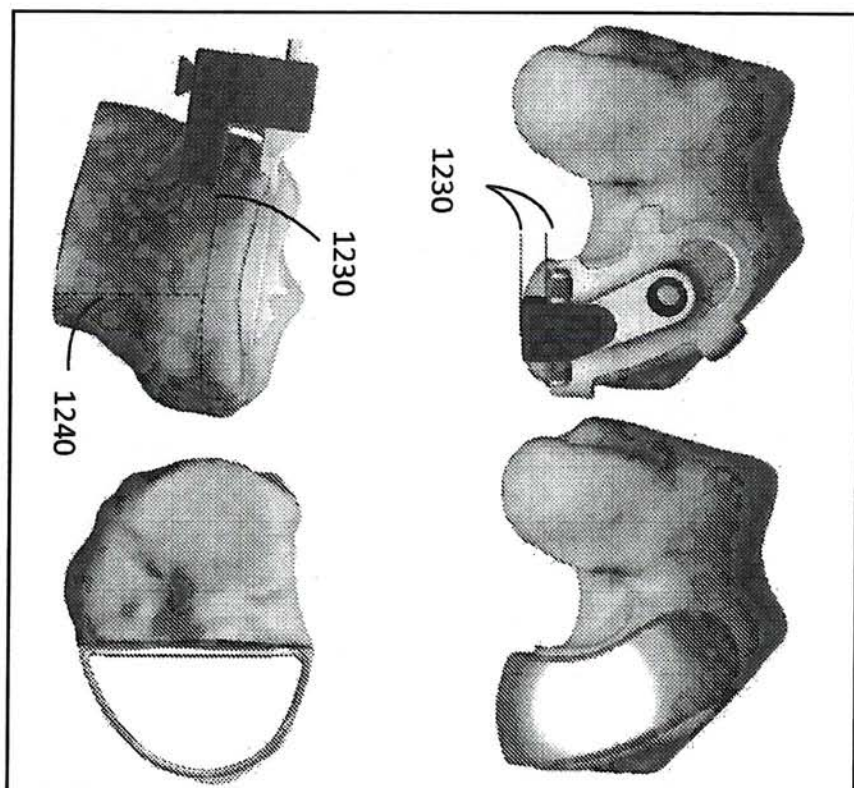


FIG. 3B

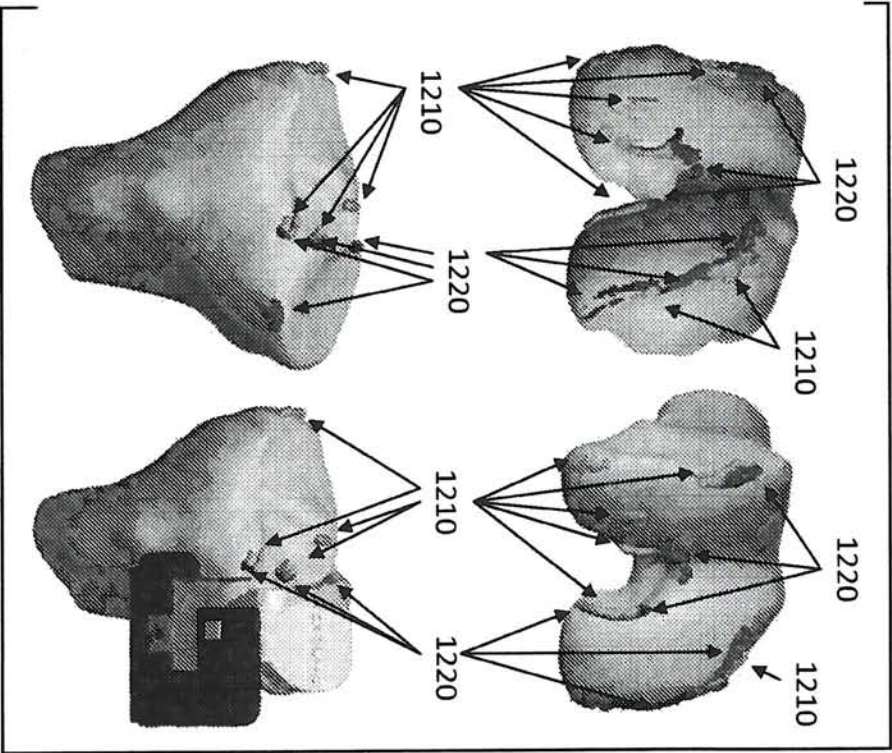


FIG. 4A

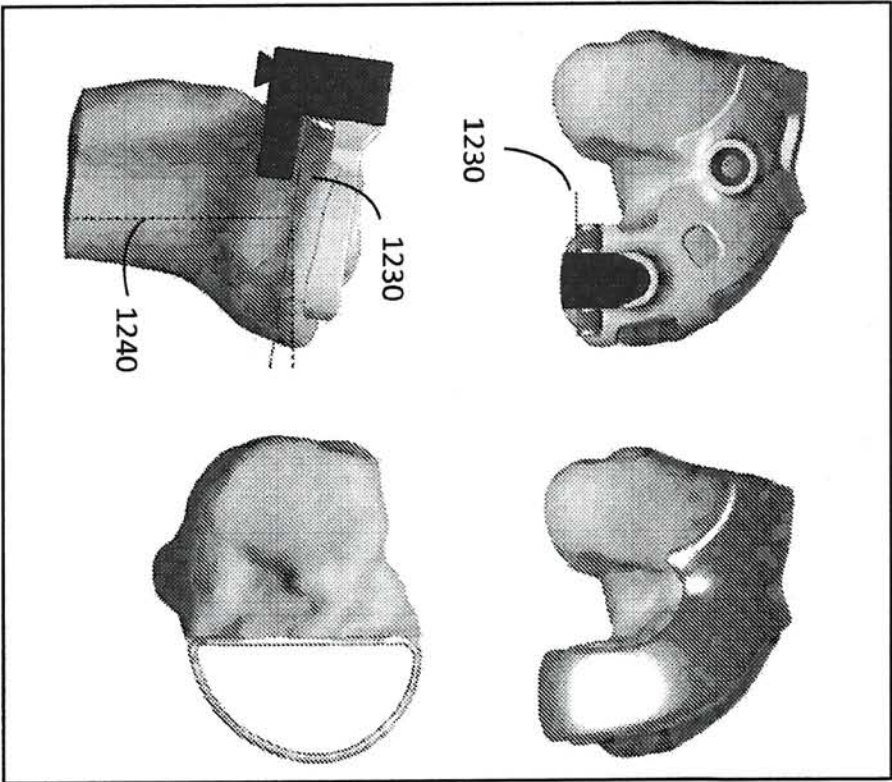


FIG. 4B

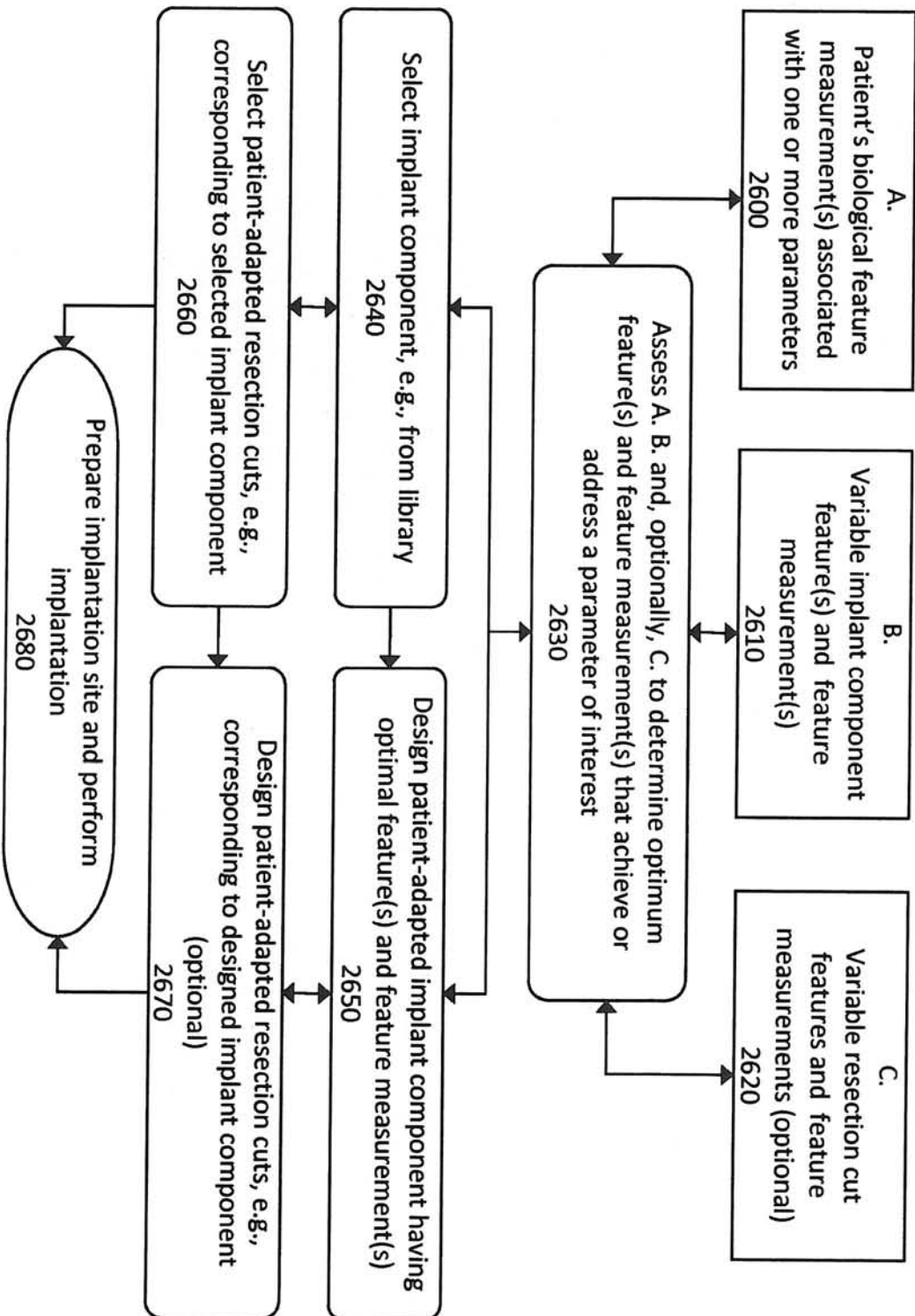


FIG. 5

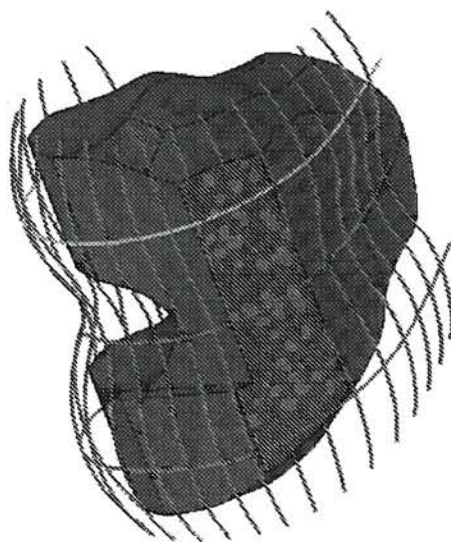


FIG. 6A

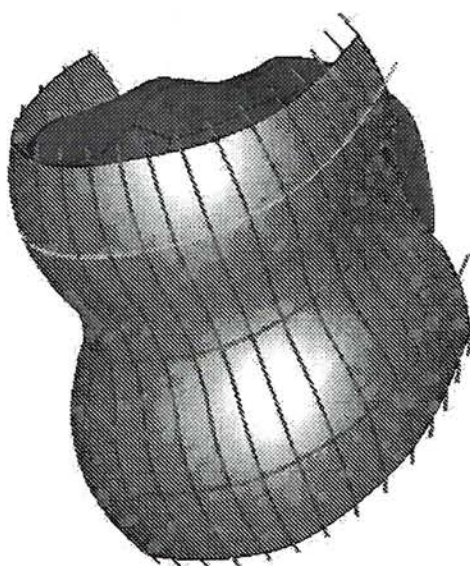


FIG. 6B

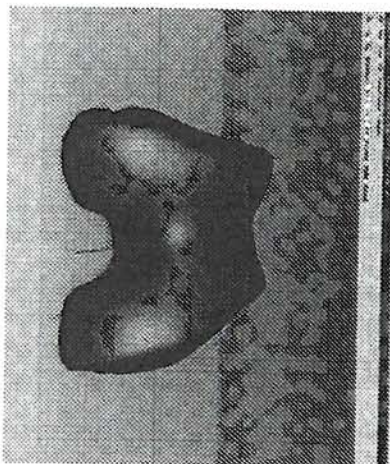


FIG. 7A

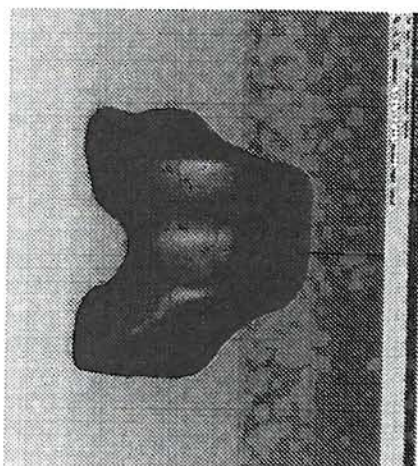


FIG. 7B

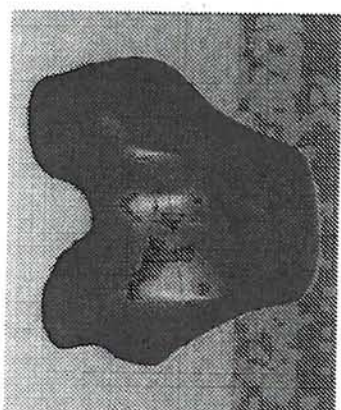


FIG. 7C

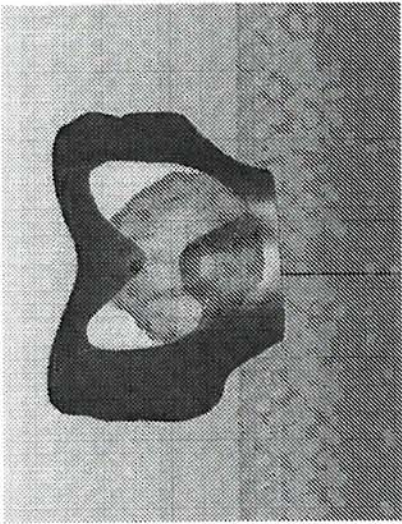


FIG. 7D

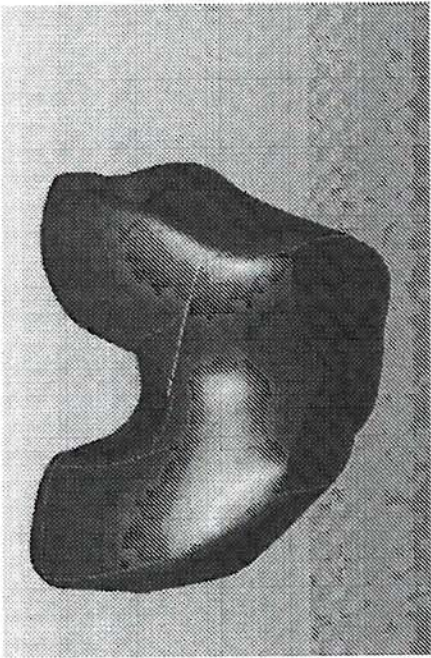


FIG. 7E

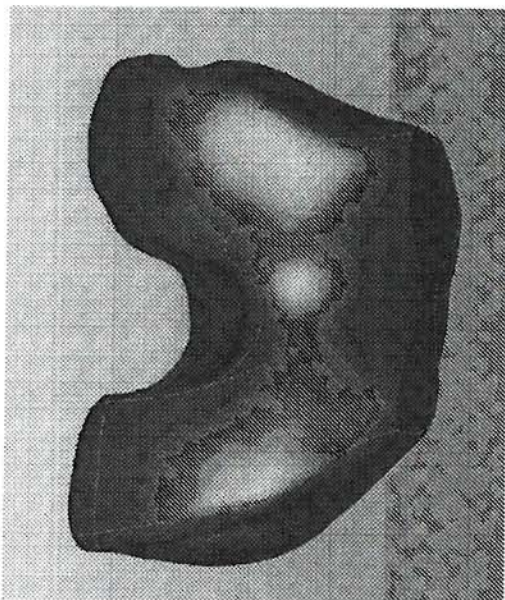


FIG. 7F

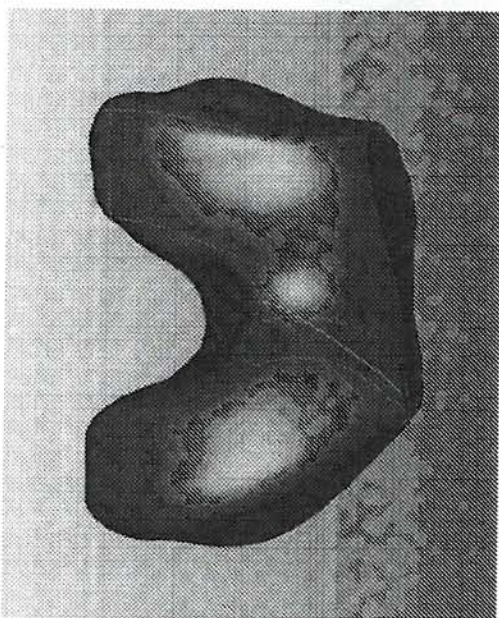


FIG. 7G

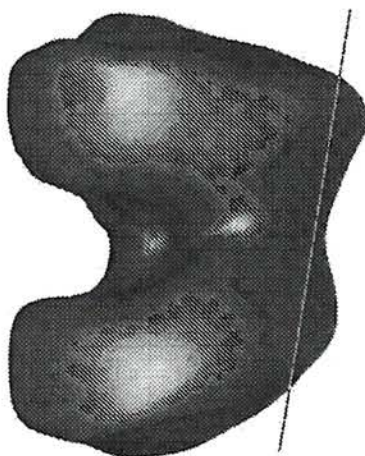


FIG. 7H

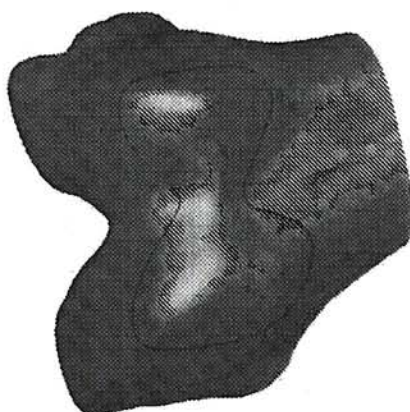


FIG. 7I

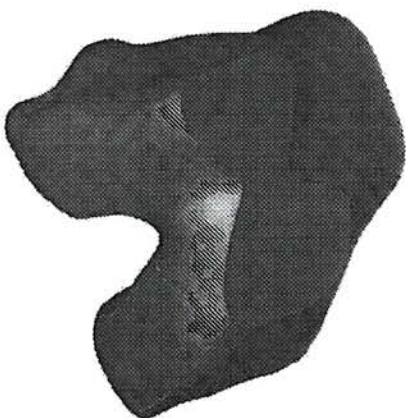


FIG. 7J

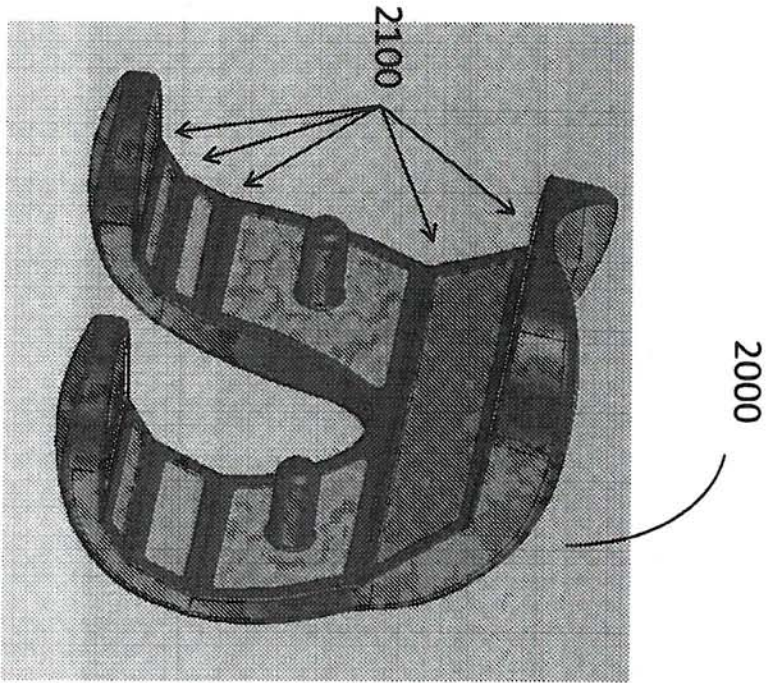


FIG. 8

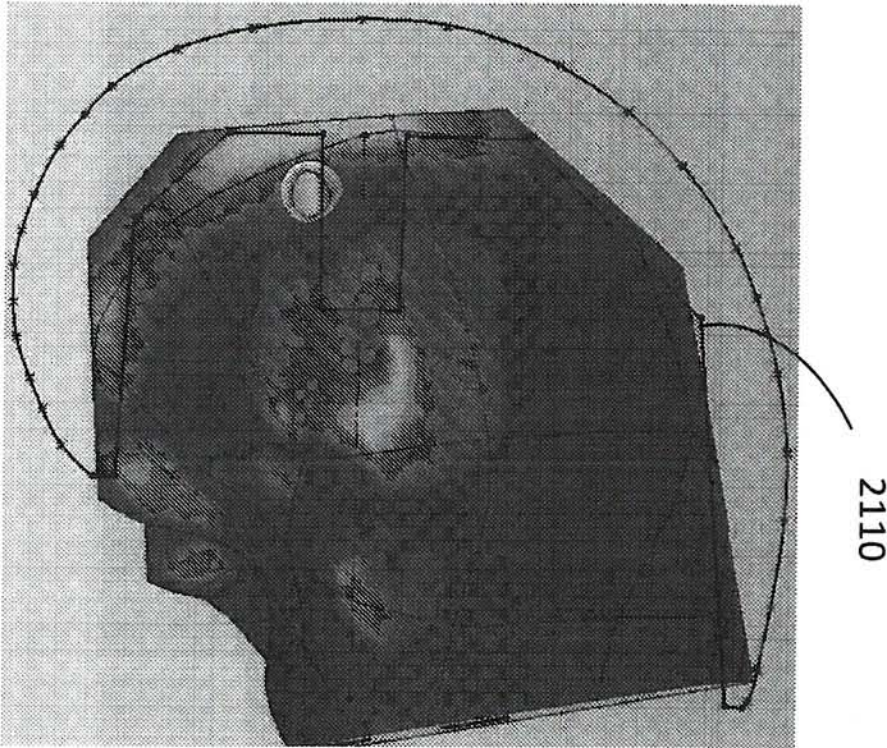


FIG. 9

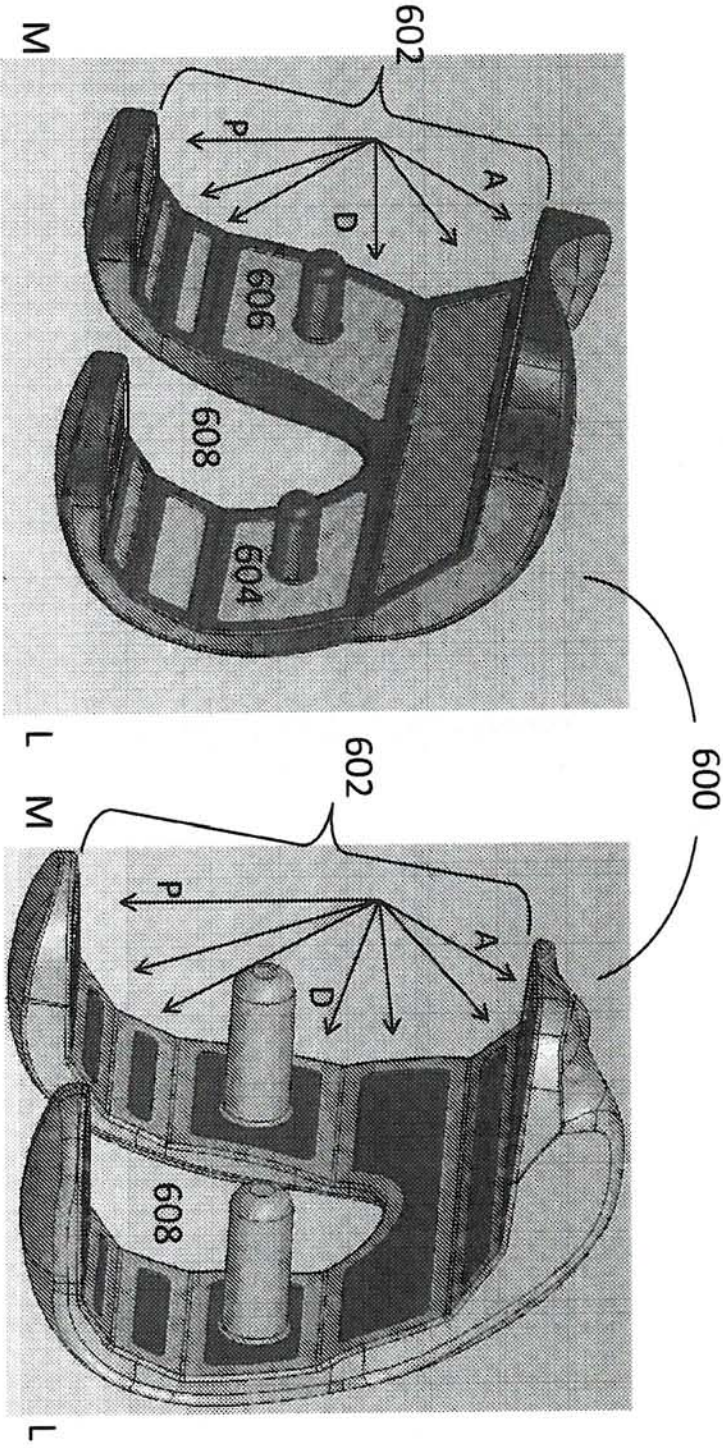


FIG. 10A

FIG. 10B

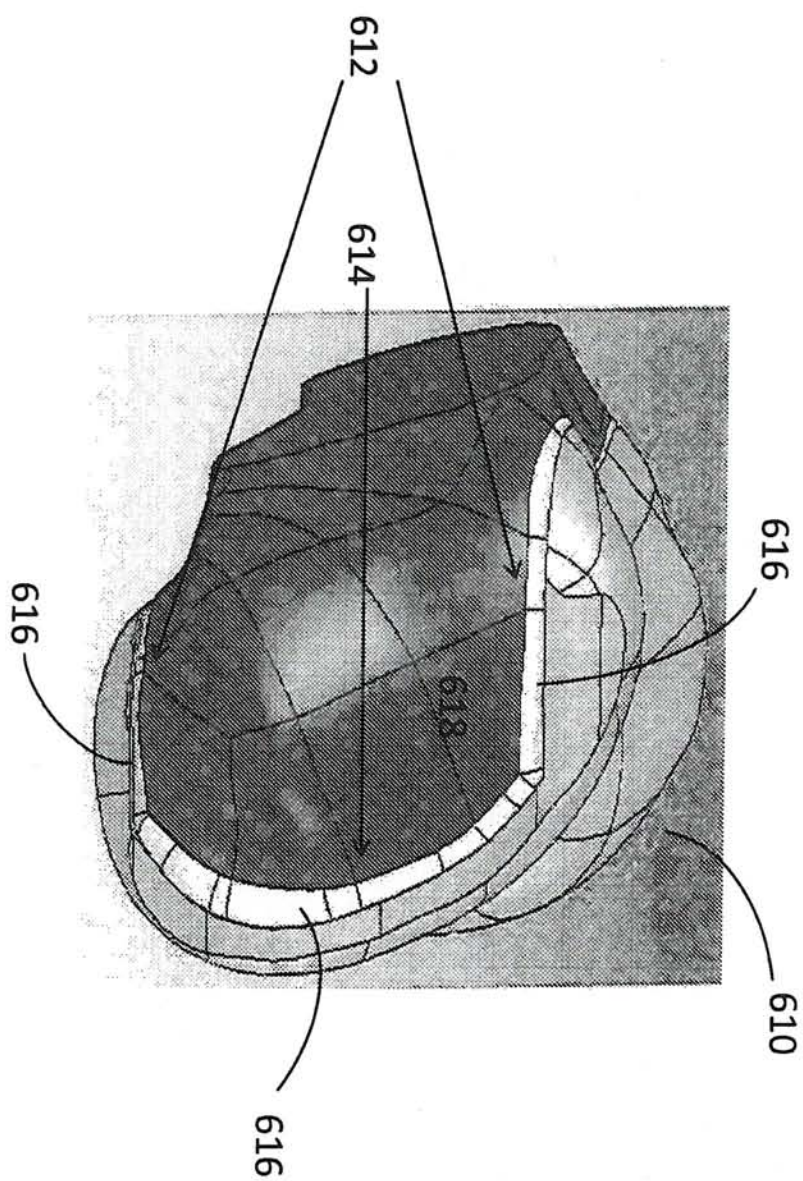


FIG. 10C

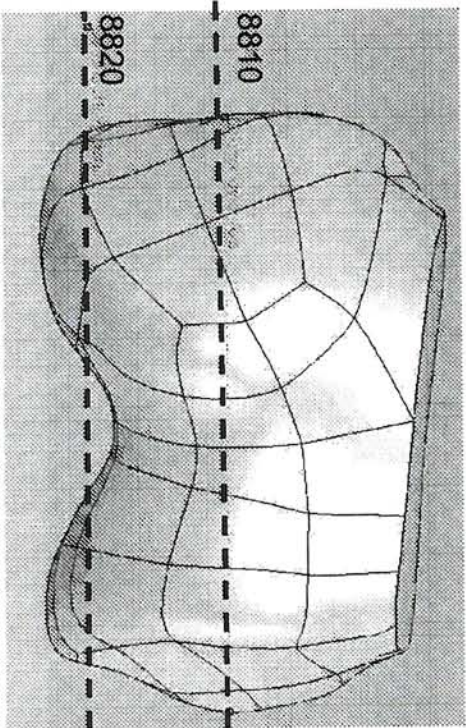


FIG. 11A

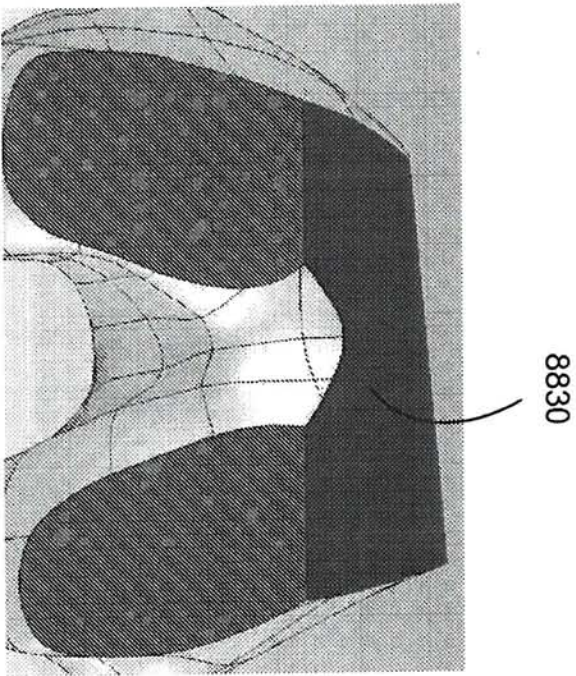


FIG. 11B

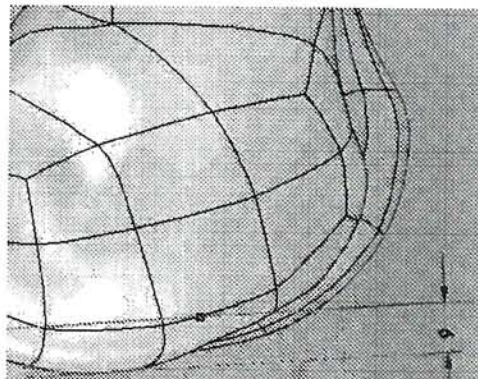


FIG. 12A

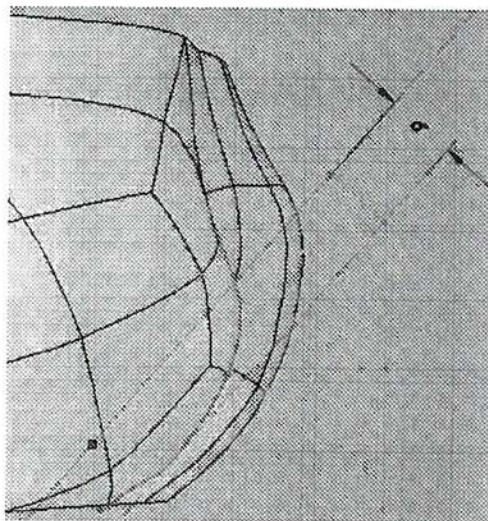


FIG. 21B

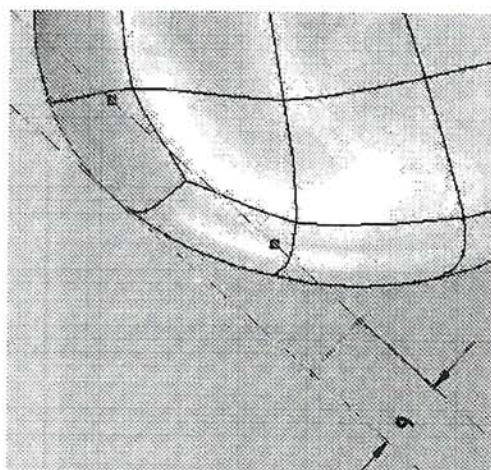


FIG. 12C

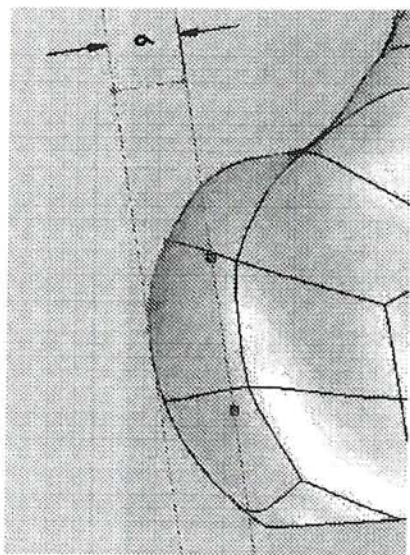


FIG. 12D

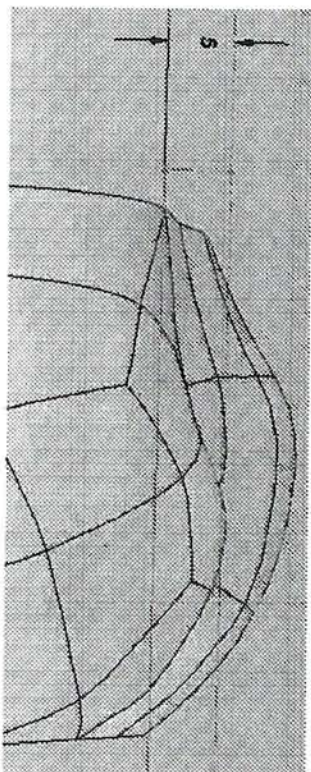


FIG. 12E

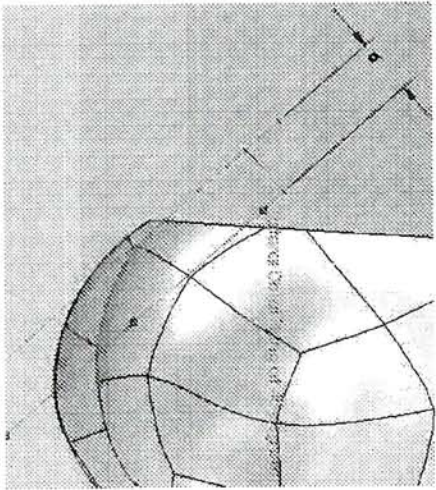


FIG. 13A

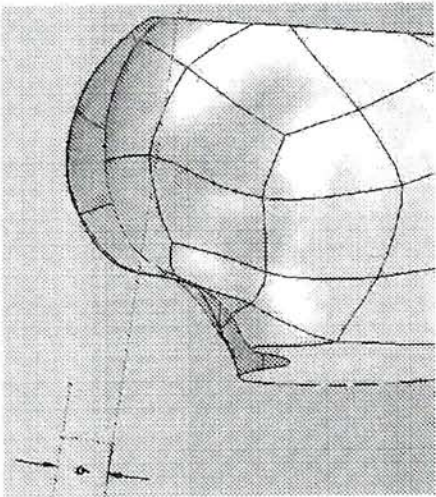


FIG. 13B

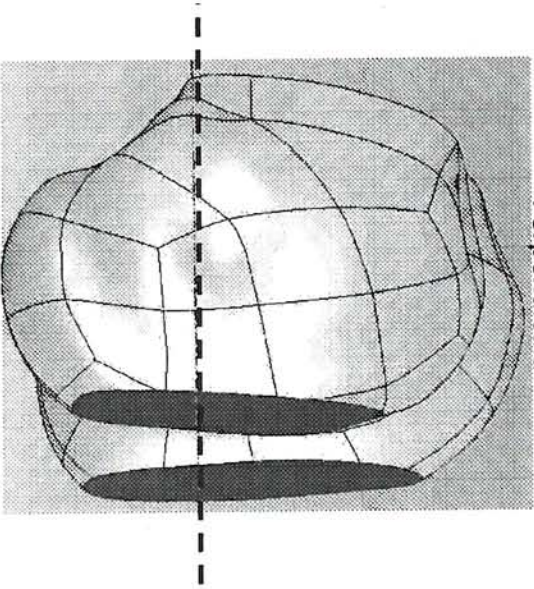


FIG. 14A

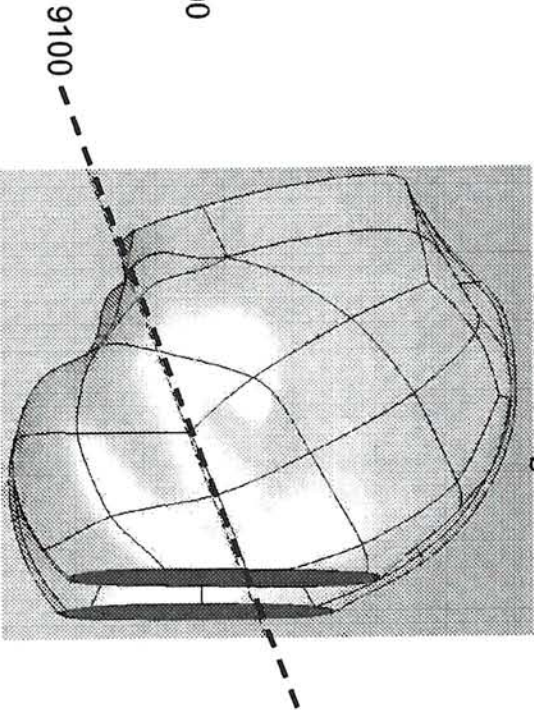


FIG. 14B

Perpendicular

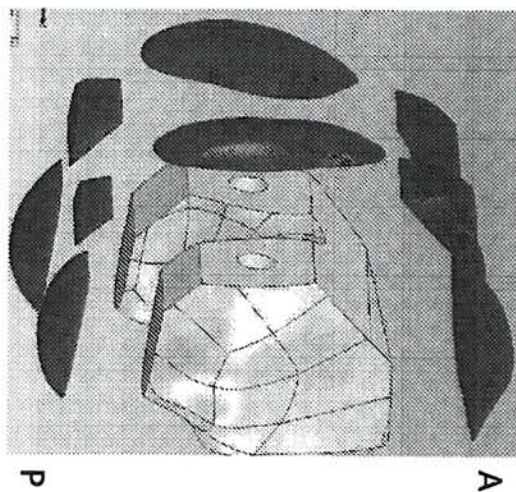


FIG. 15A

Rotated 15 degrees

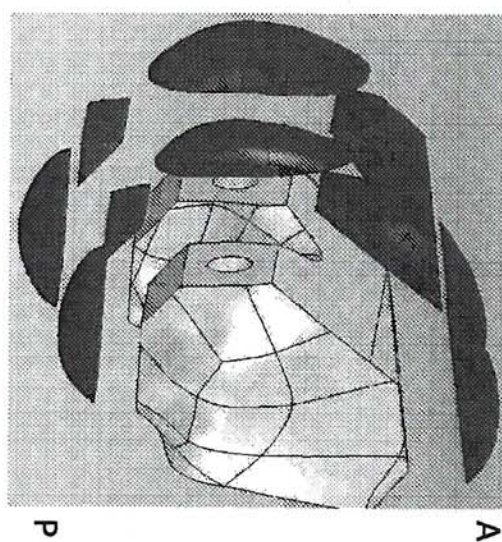


FIG. 15B

Perpendicular

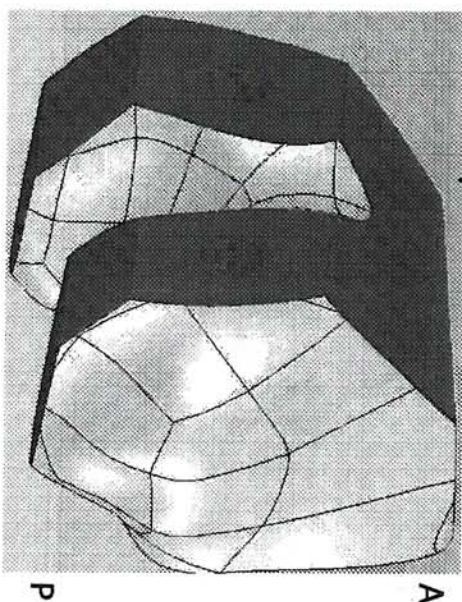


FIG. 16A

Rotated 15m degrees

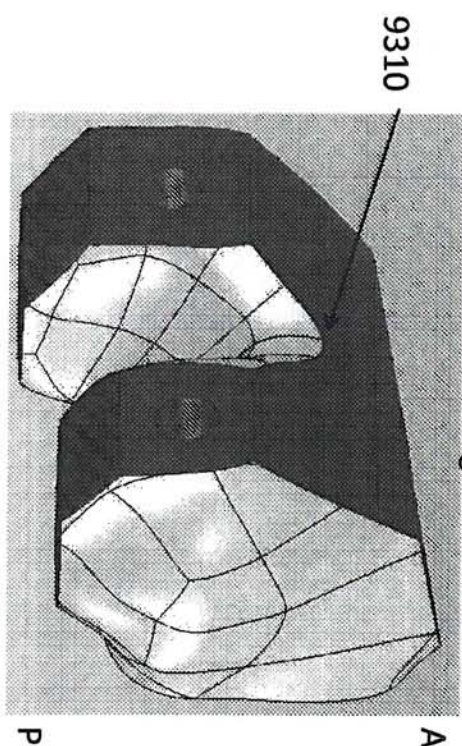


FIG. 16B

FIG. 17A

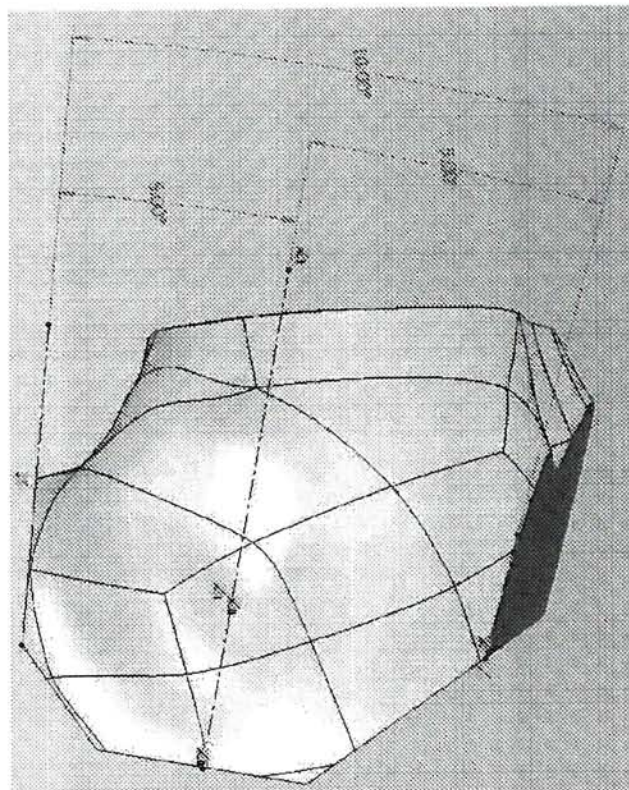
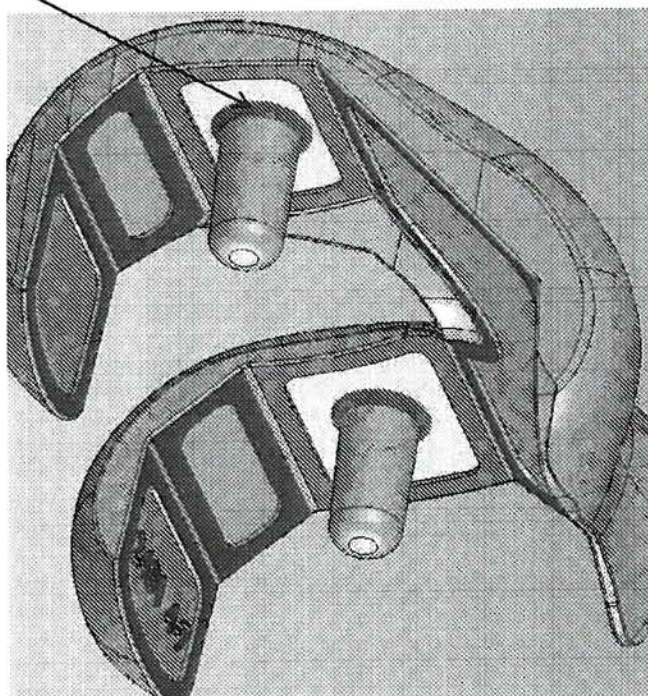


FIG. 17B



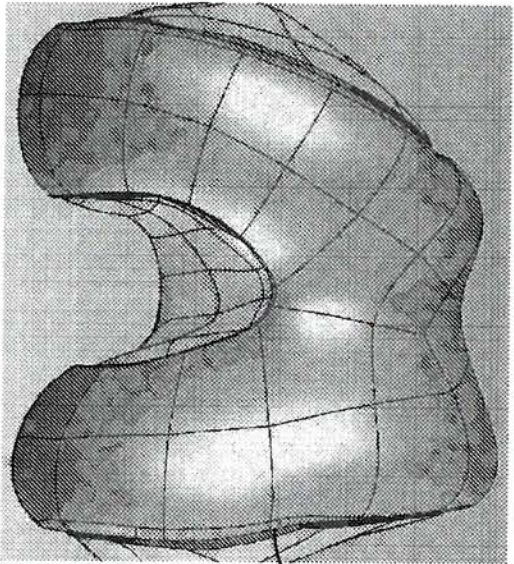


FIG. 18A

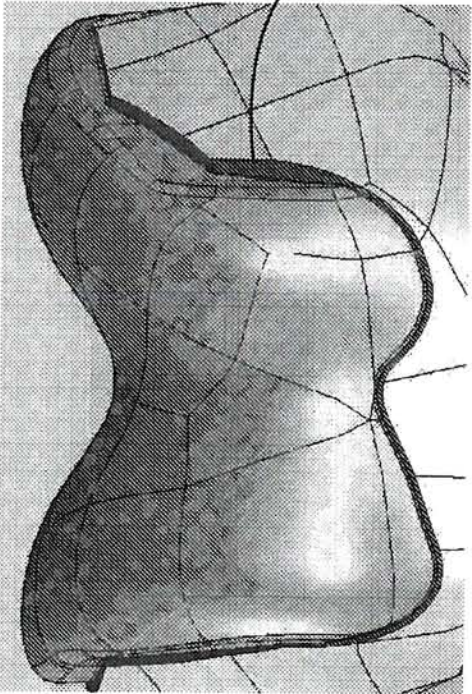


FIG. 18B

9510

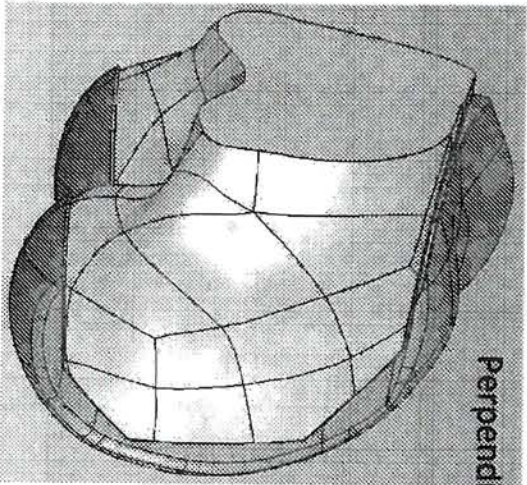


FIG. 19A

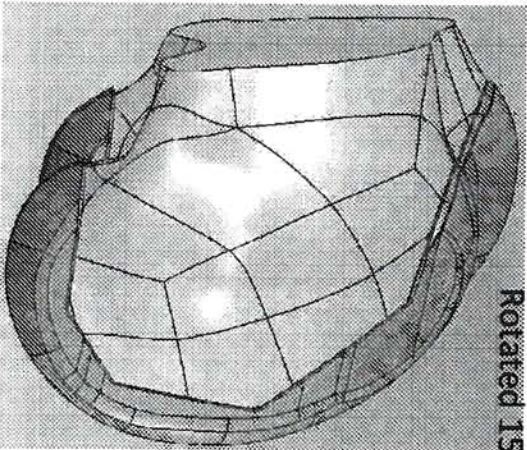


FIG. 19B

Rotated 15 degrees

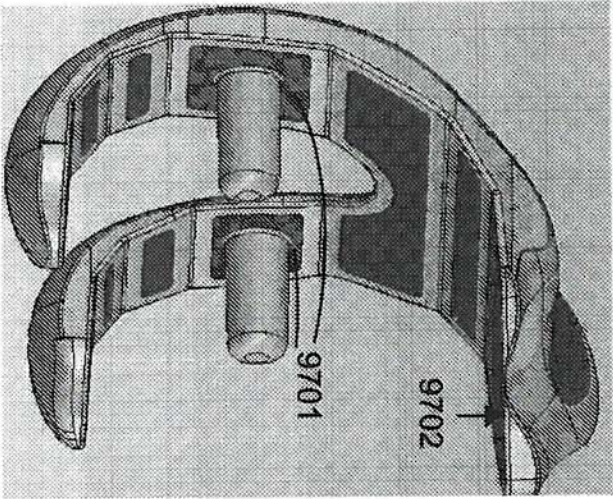


FIG. 20

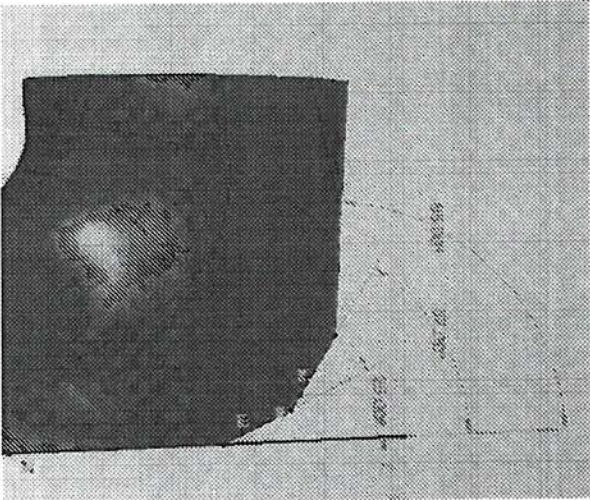


FIG. 21A

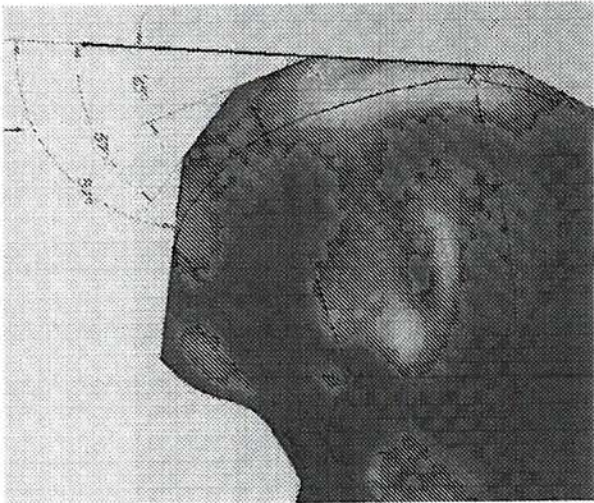
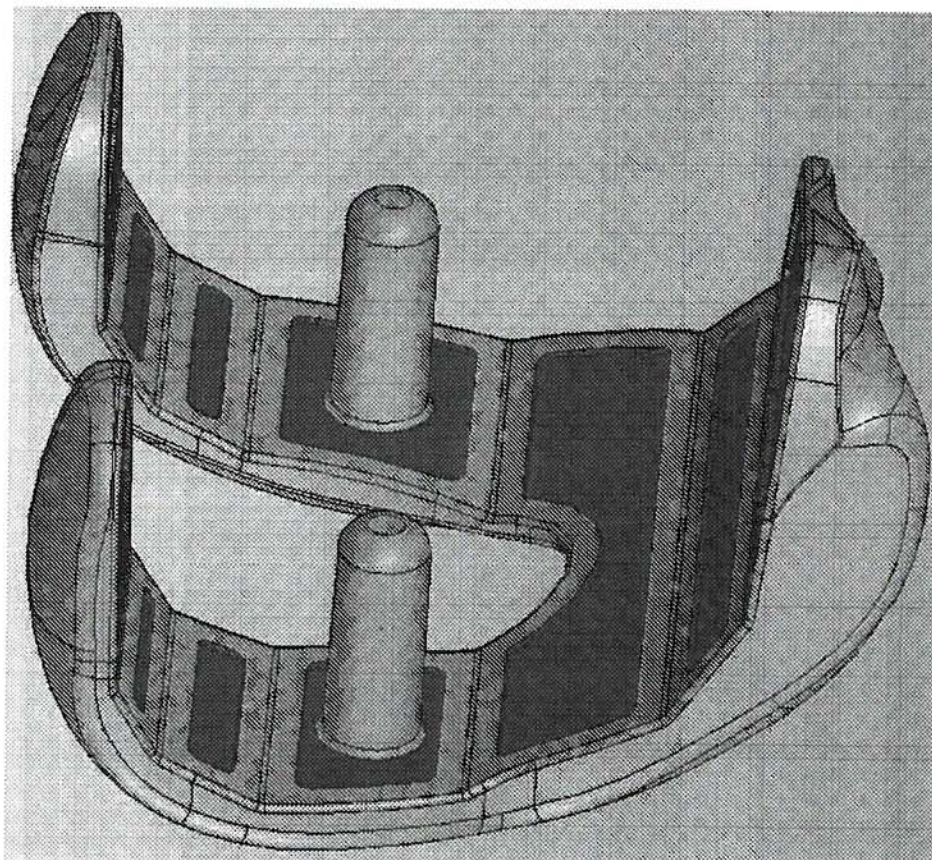


FIG. 21B

Anterior cuts

Posterior cuts

FIG. 22



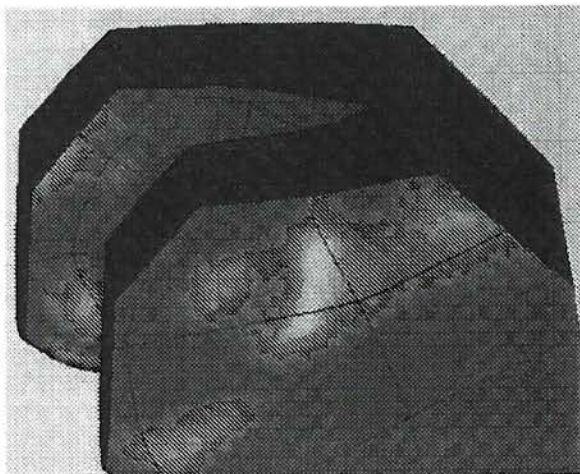


FIG. 23A



FIG. 23B

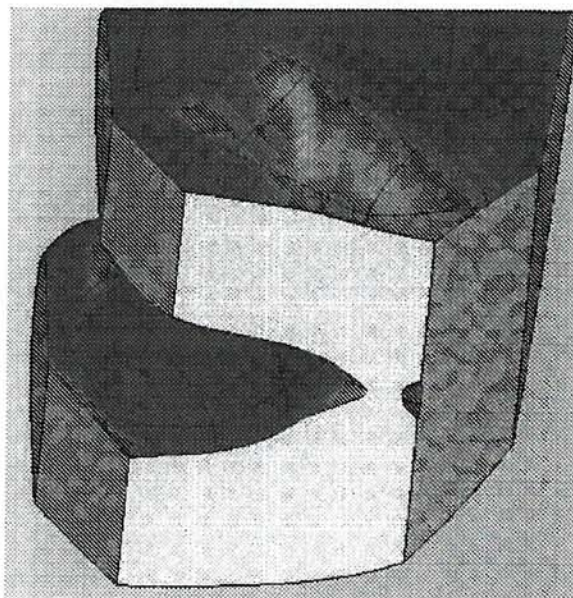


FIG. 24A

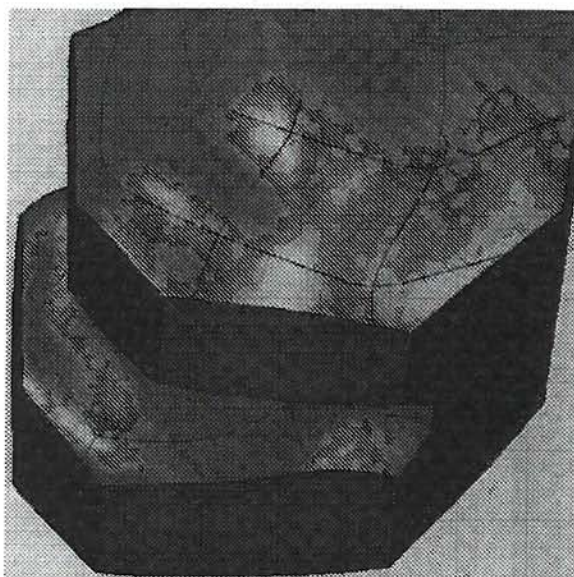


FIG. 24B

FIG. 25A

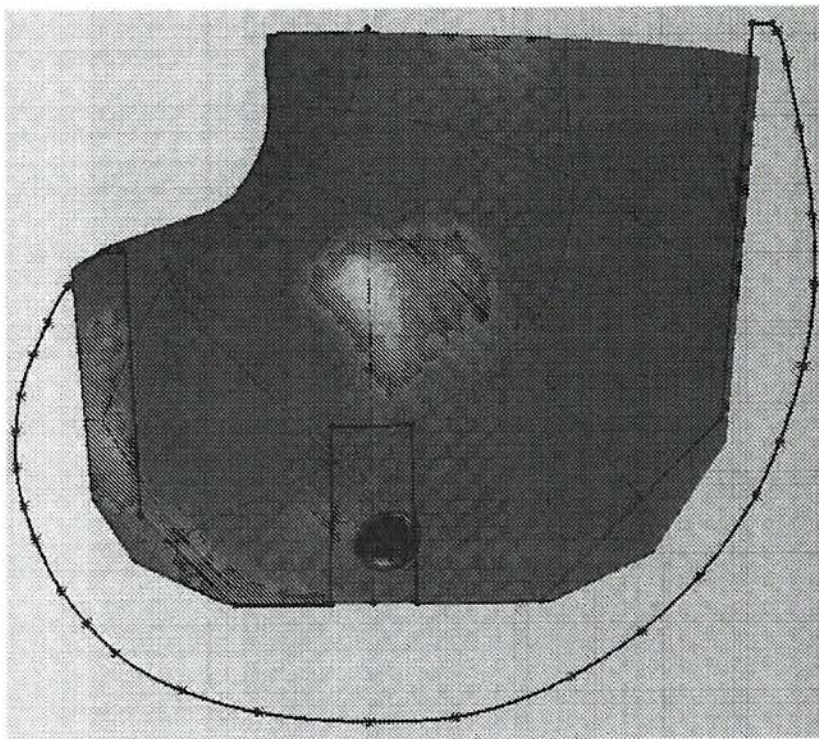


FIG. 25B

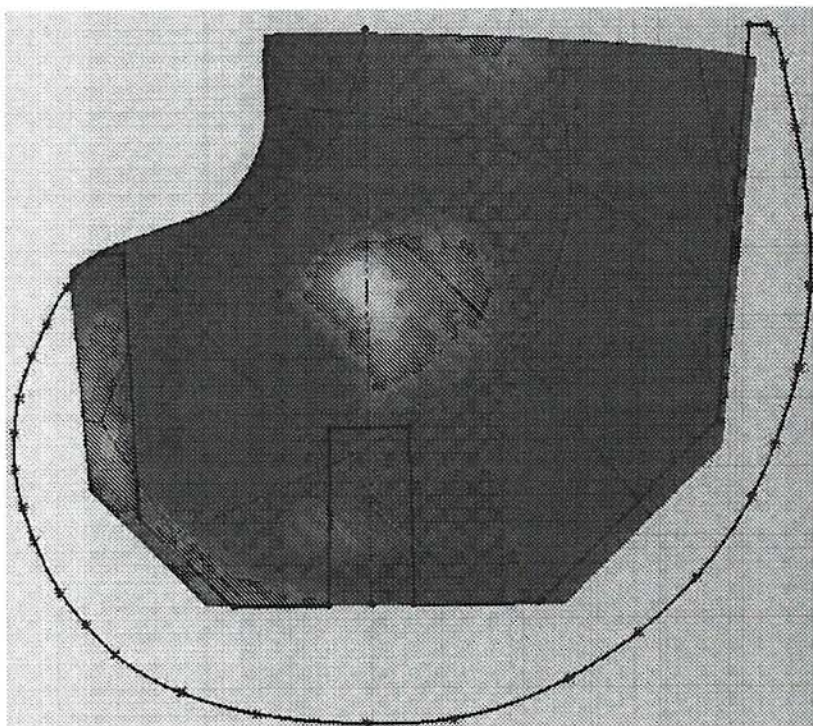


FIG. 25C

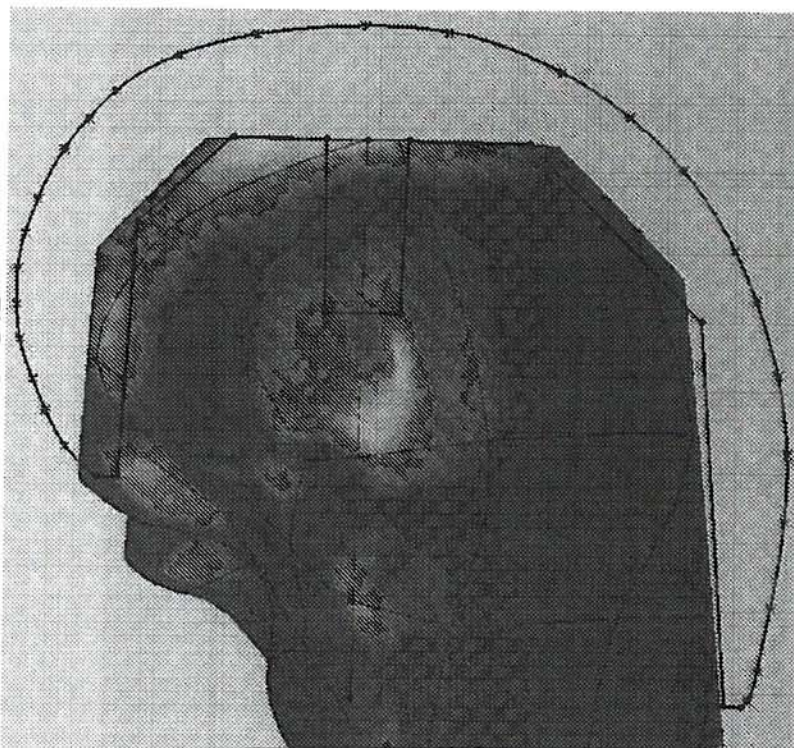
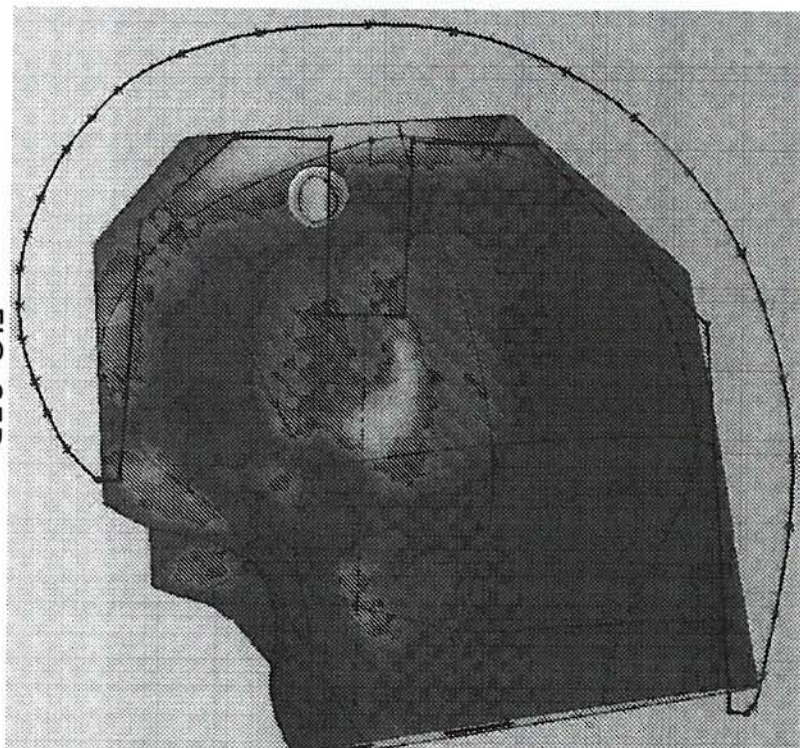


FIG. 25D



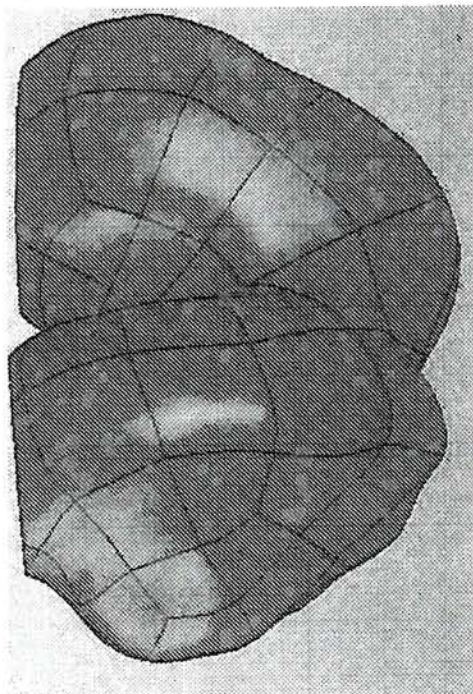


FIG. 26A

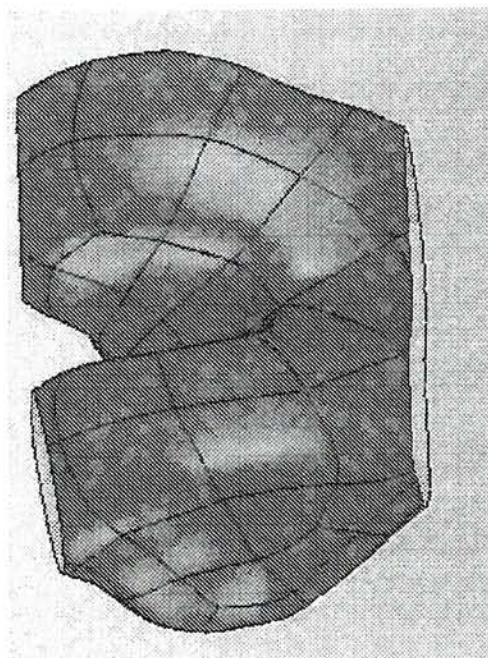


FIG. 26B

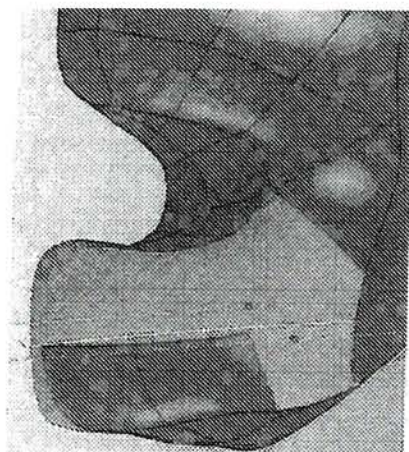


FIG. 27A

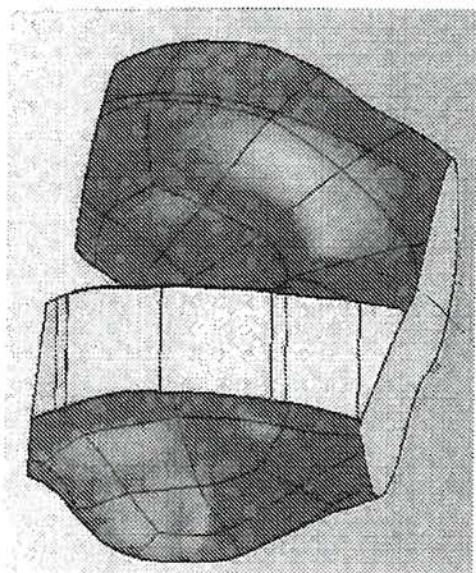


FIG. 27C

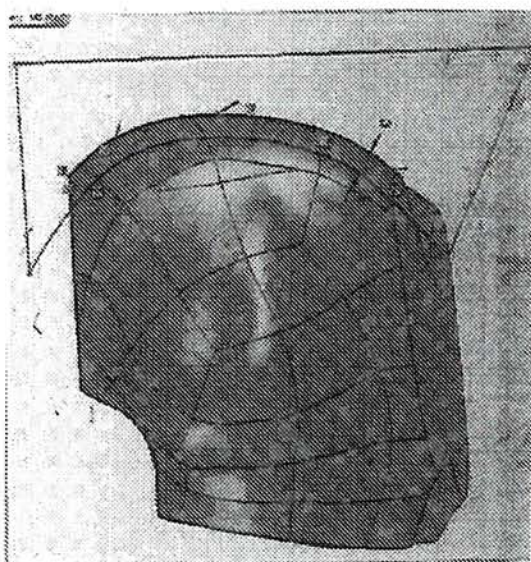


FIG. 27B

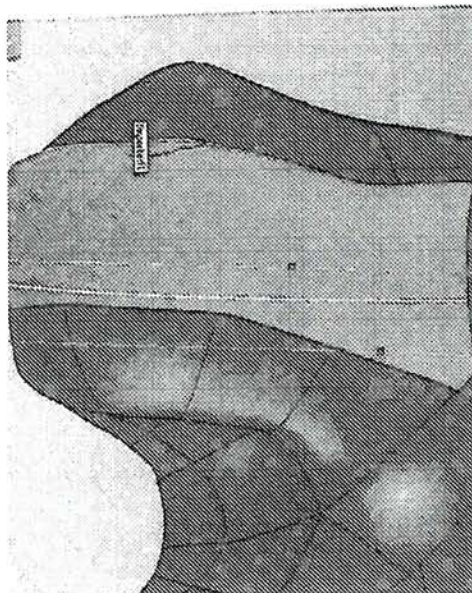


FIG. 28A

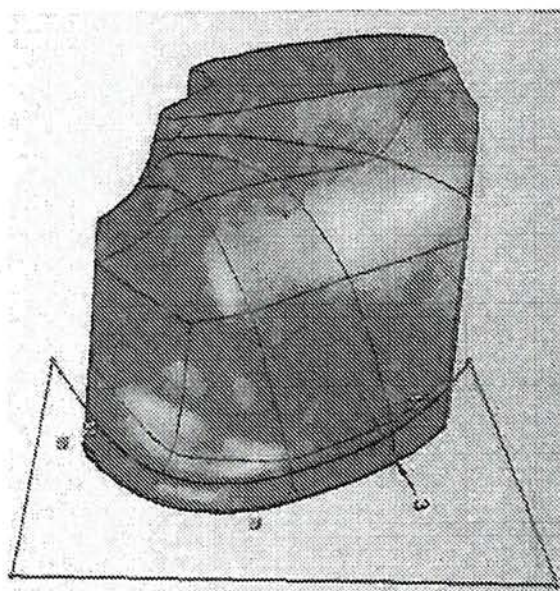


FIG. 28B

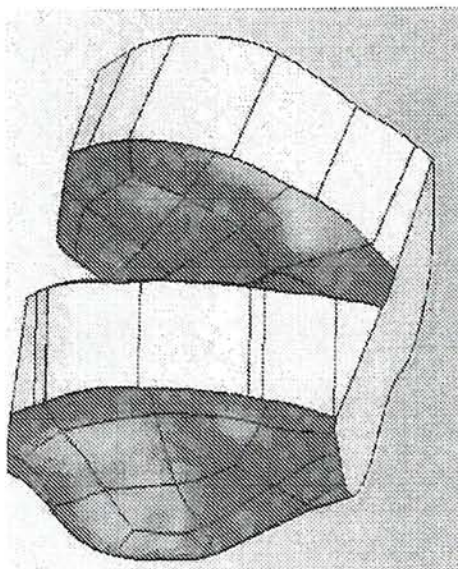


FIG. 28C

FIG. 29C

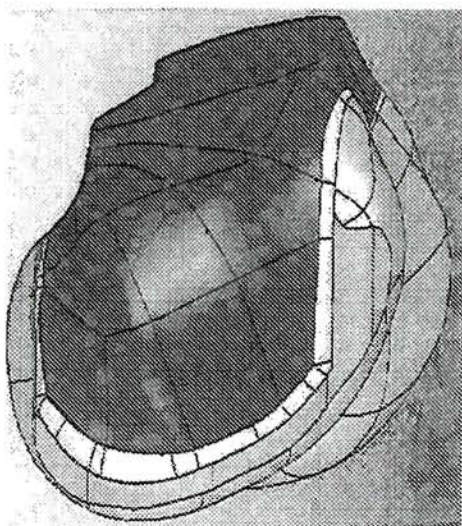


FIG. 29A

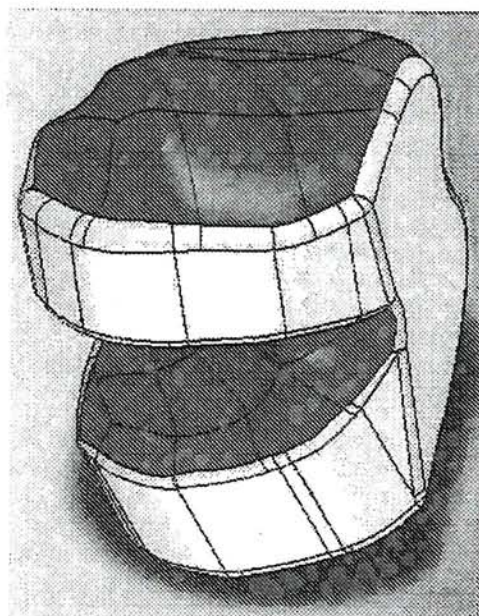
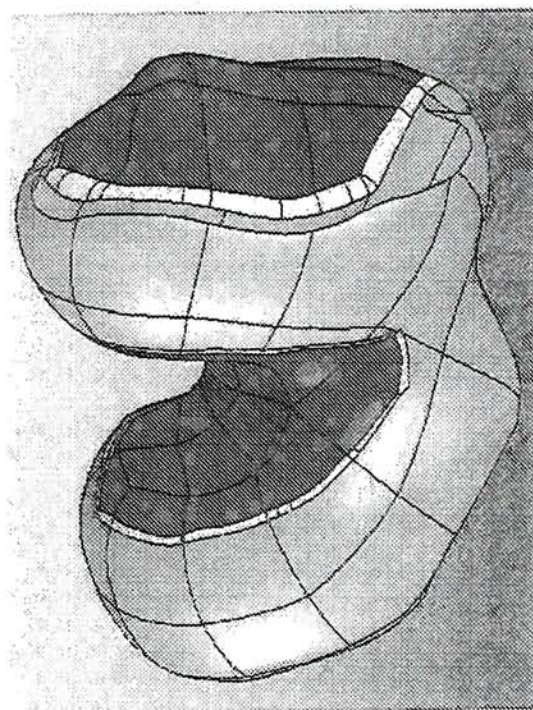


FIG. 29B



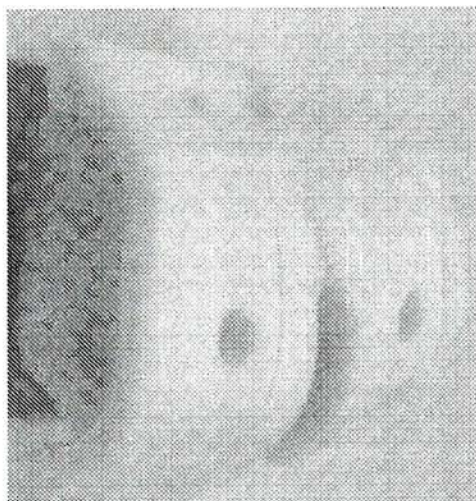


FIG. 30A

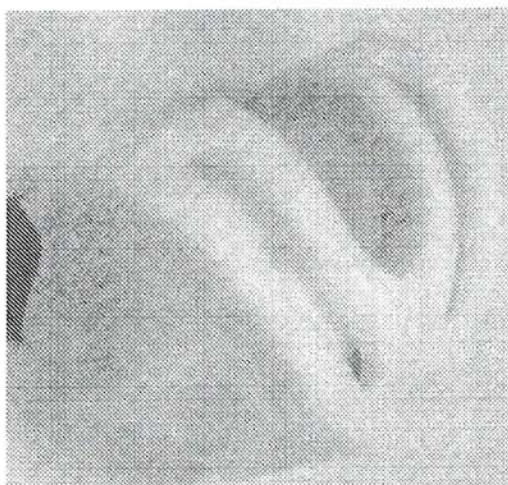


FIG. 30B

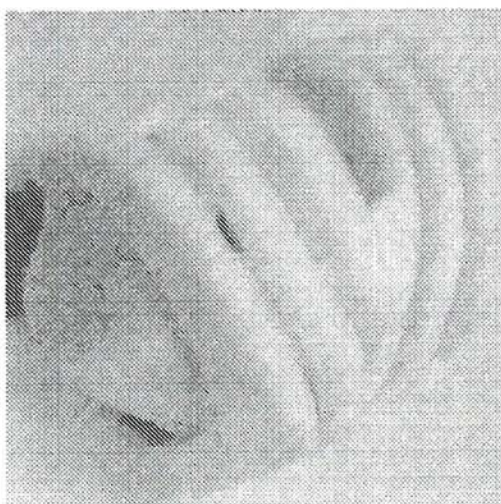


FIG. 30C

FIG. 31A

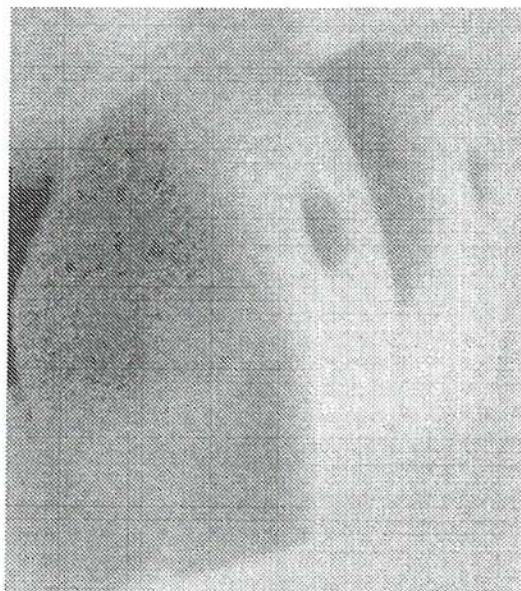
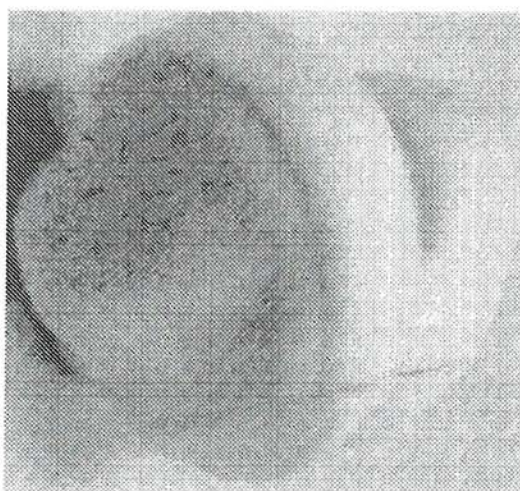


FIG. 31B



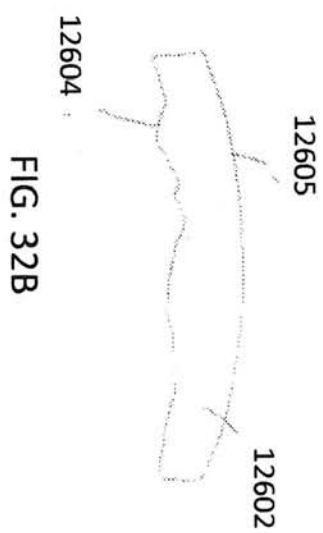
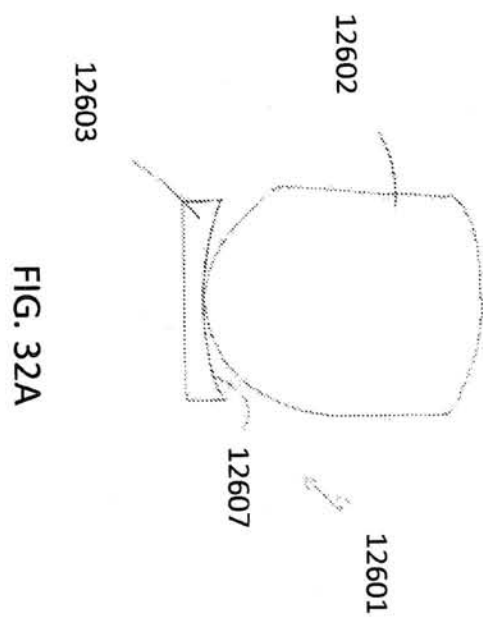




FIG. 32C



FIG. 32E



FIG. 32D

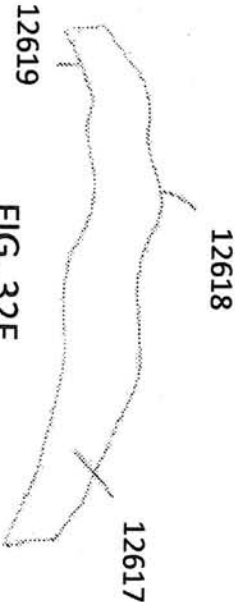


FIG. 32F

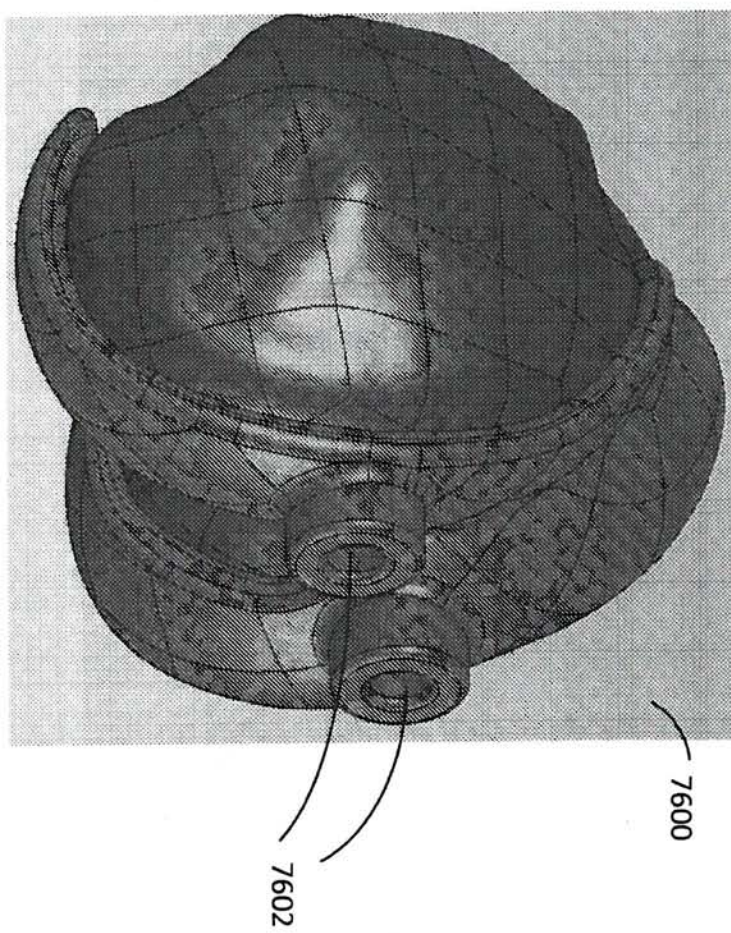


FIG. 33

FIG. 34A

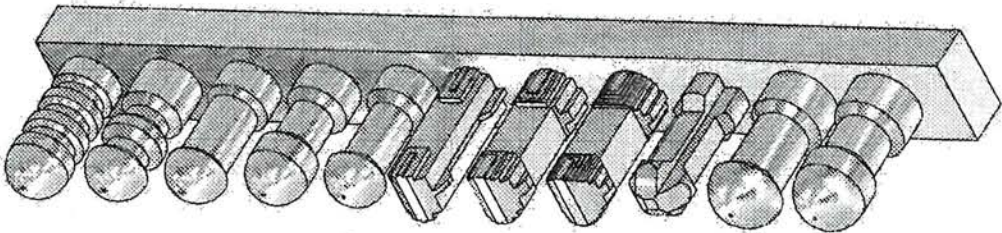
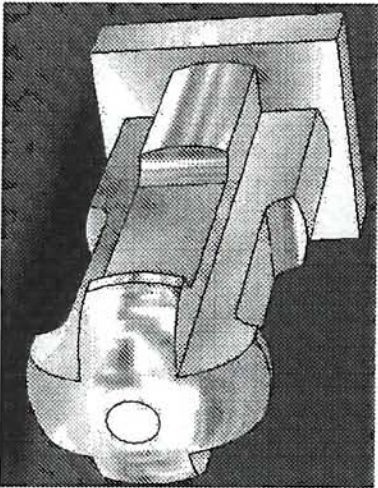


FIG. 34B



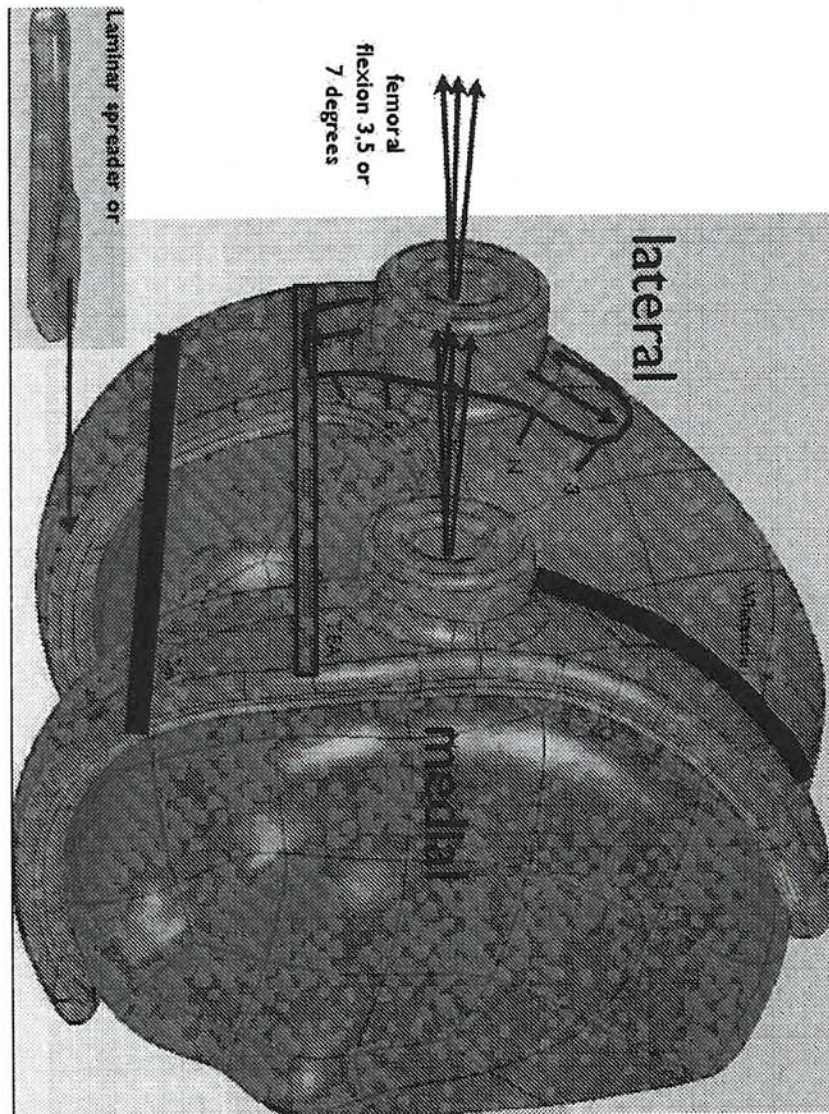


FIG. 35

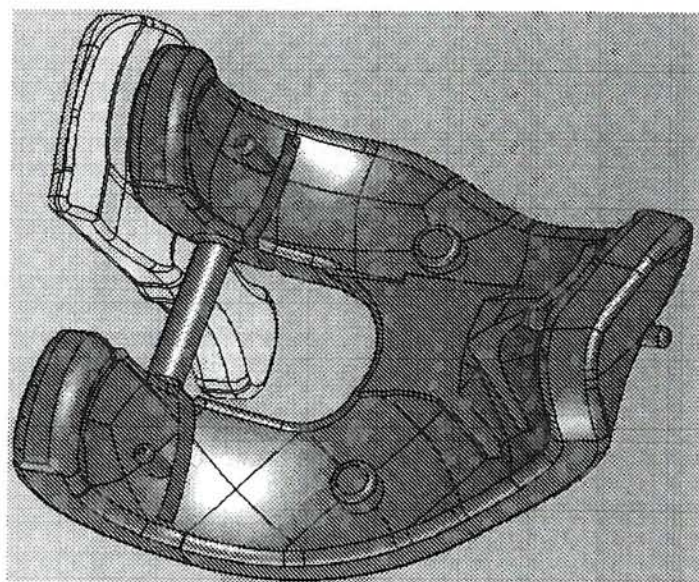
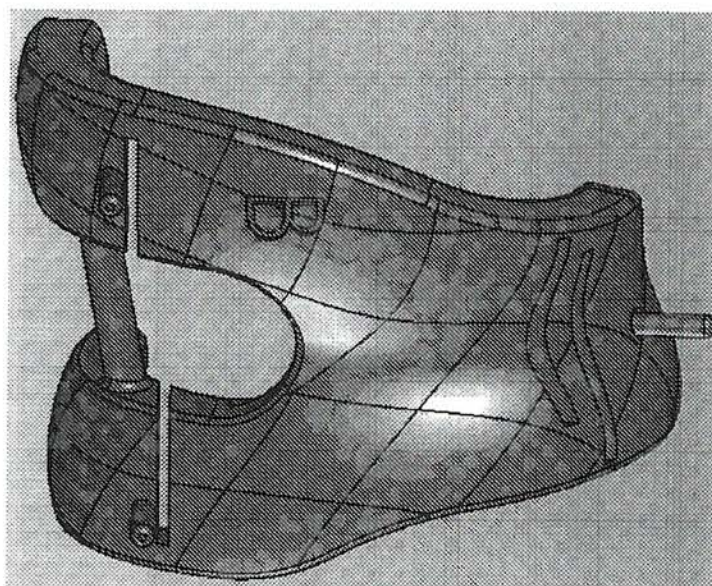


FIG. 36



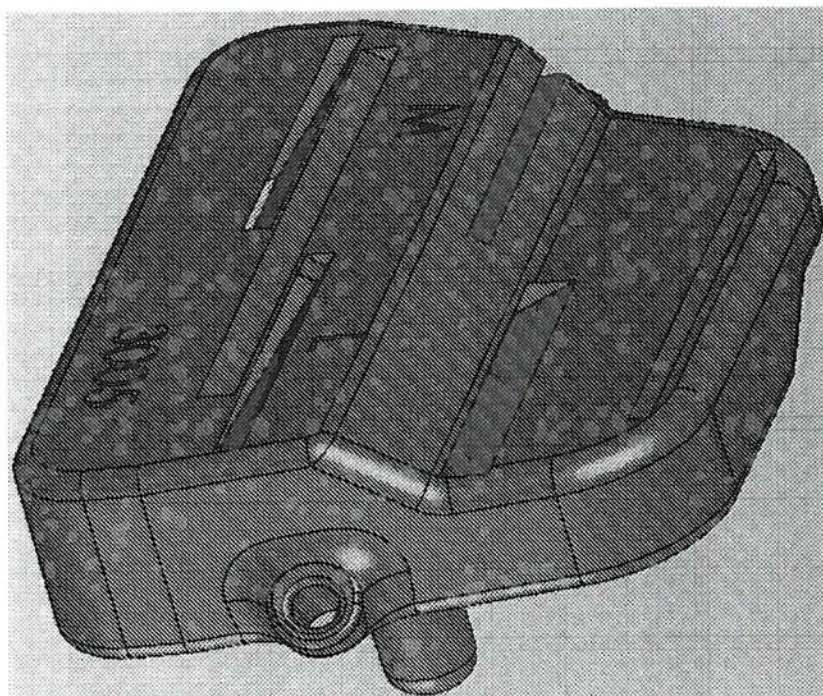


FIG. 37A

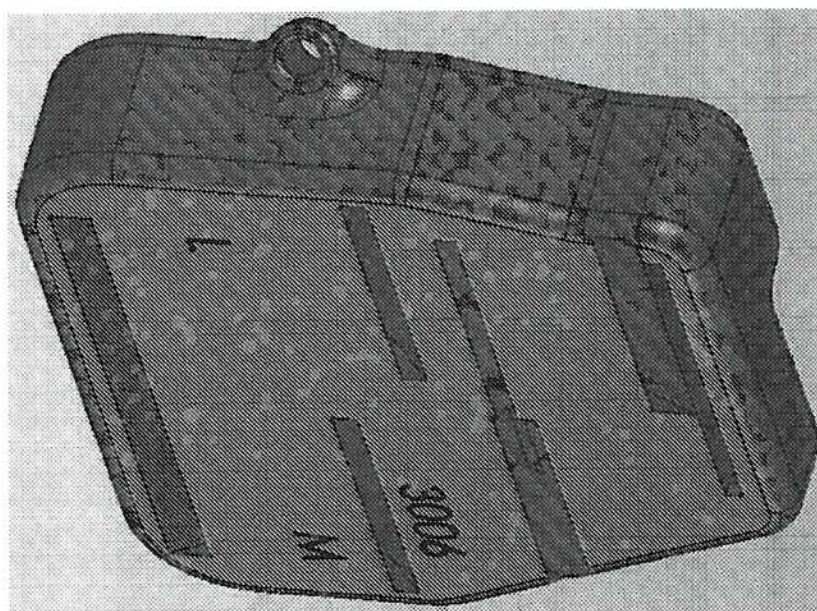


FIG. 37B

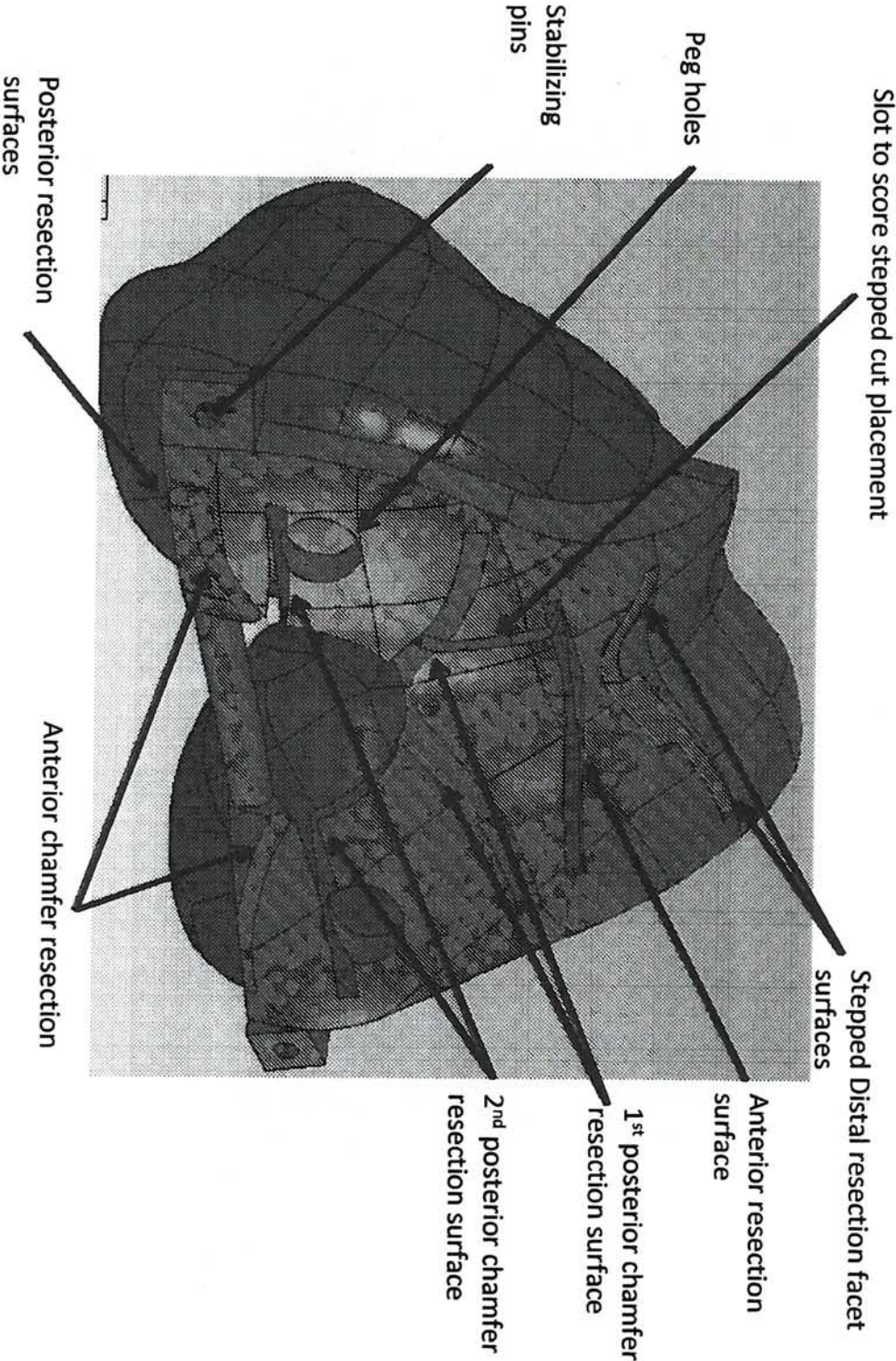


FIG. 38

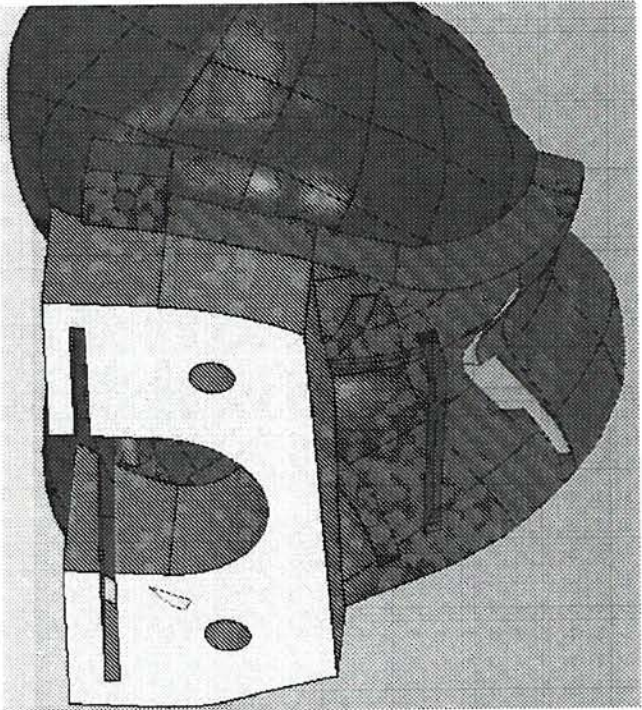


FIG. 39A

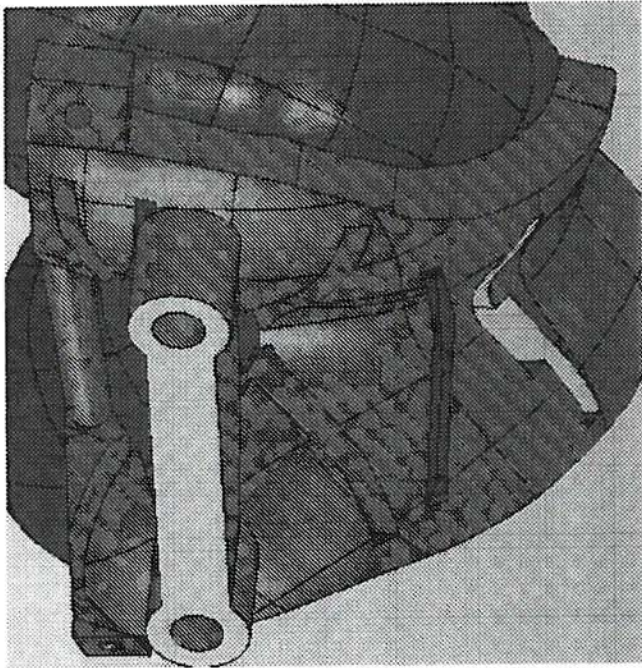


FIG. 39B



FIG. 40A

8210

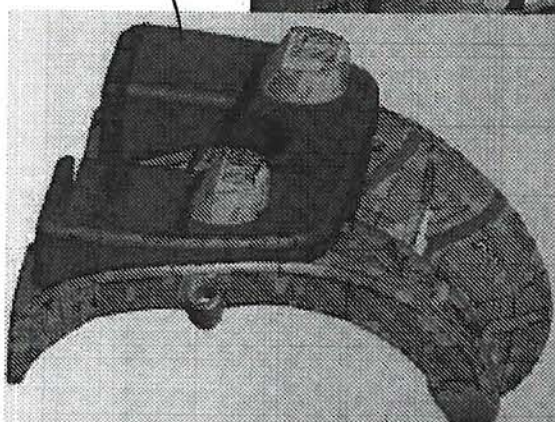


FIG. 40C

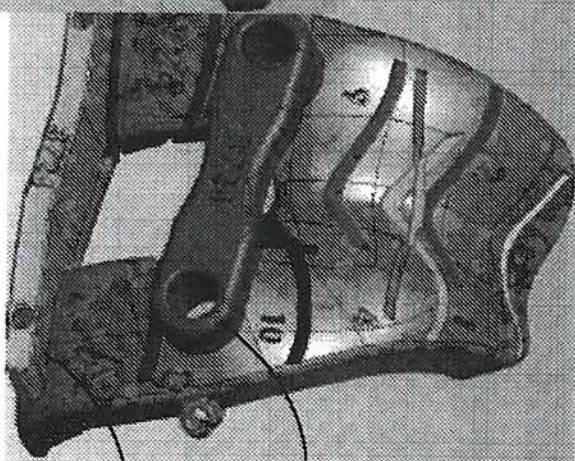


FIG. 40B

8220

8230

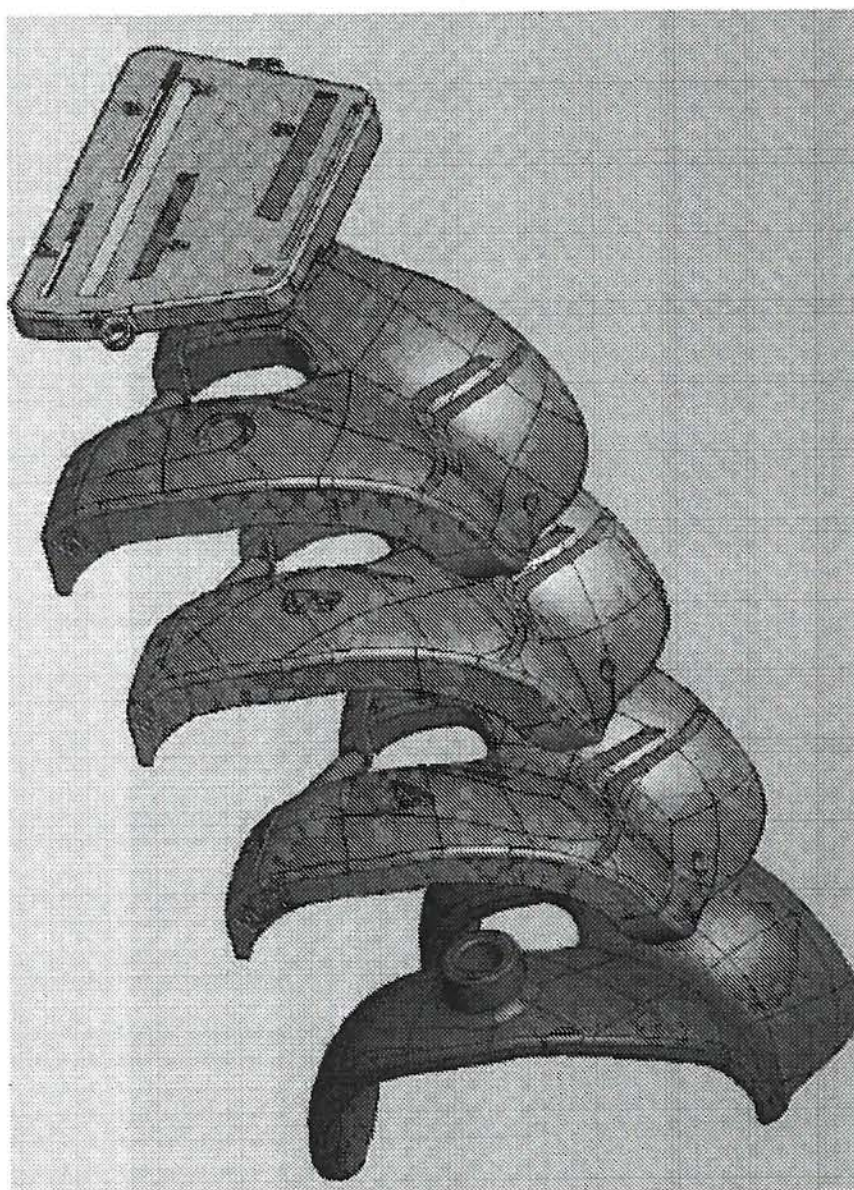


FIG. 41

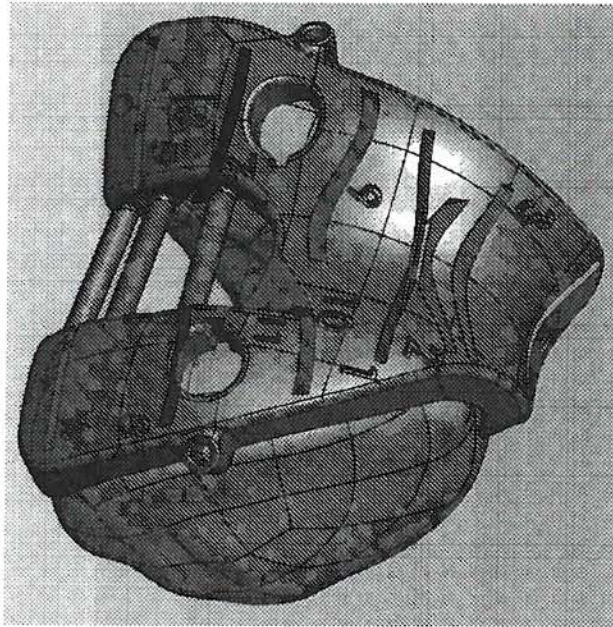


FIG. 42A

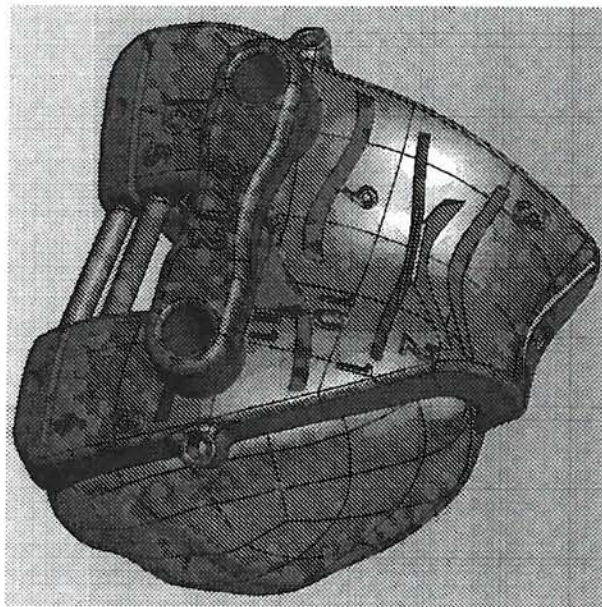


FIG. 42B

FIG. 42C

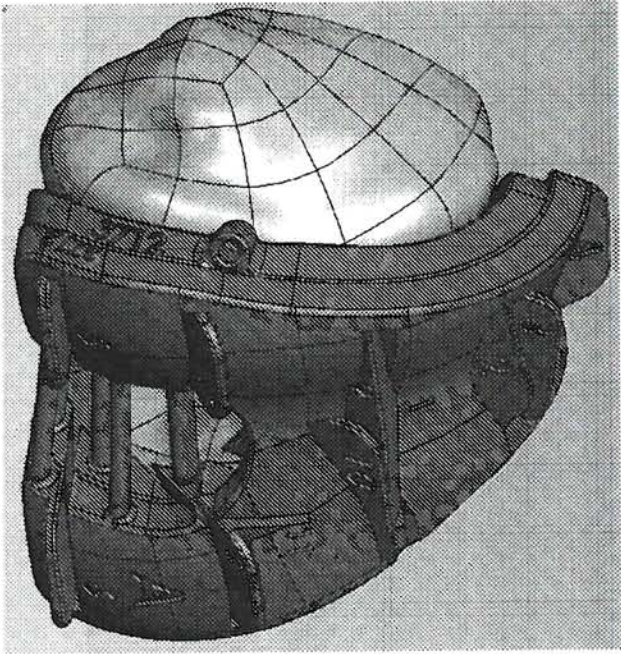


FIG. 42D

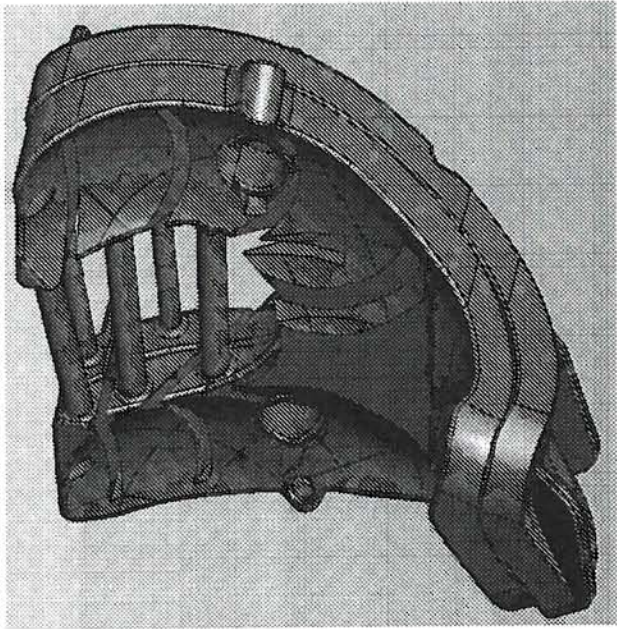
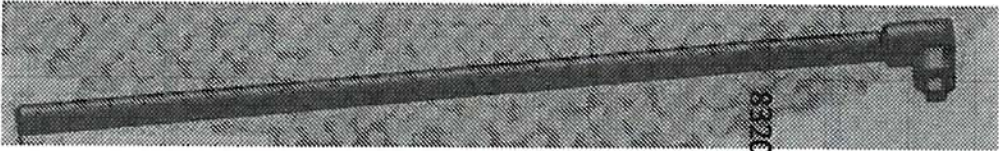


FIG. 43A



8310



FIG. 43B

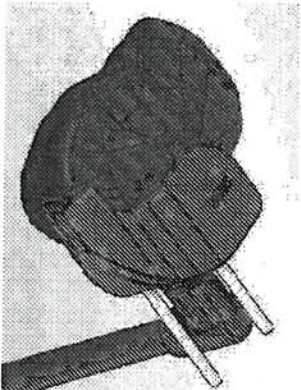


FIG. 43C

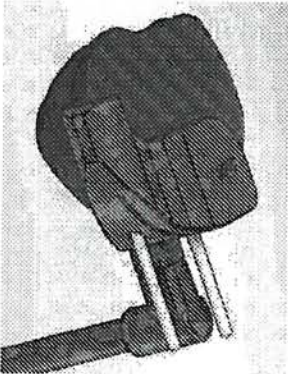


FIG. 43D

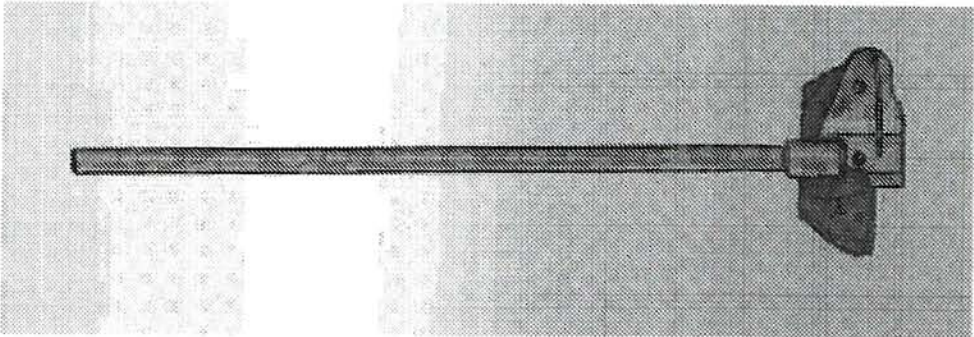


FIG. 43E

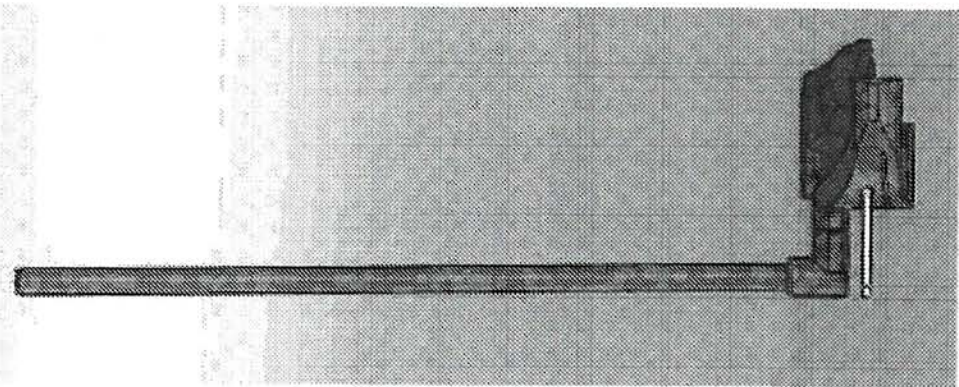


FIG. 43F

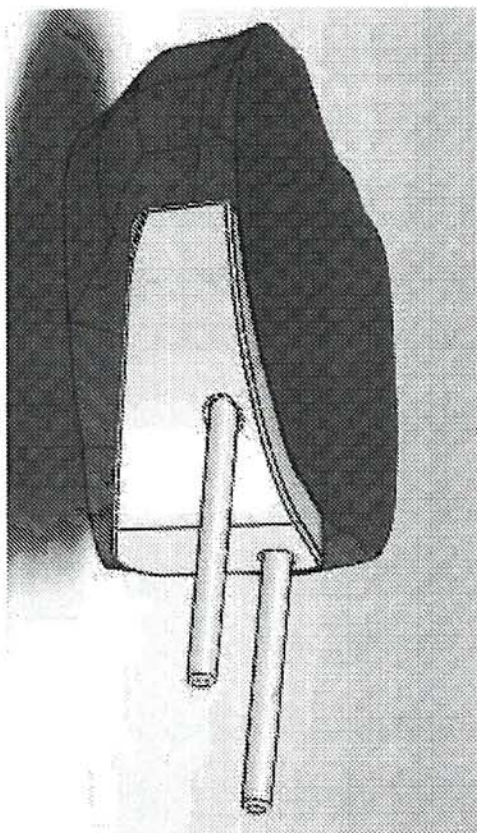


FIG. 43H

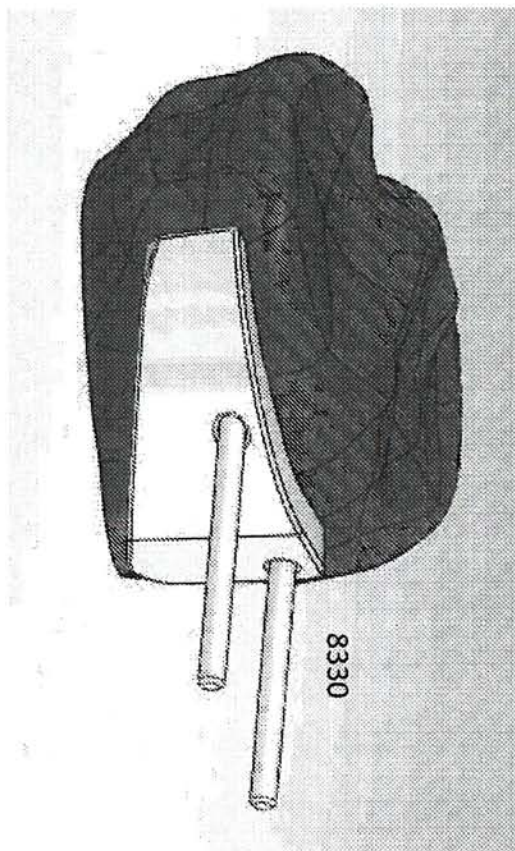
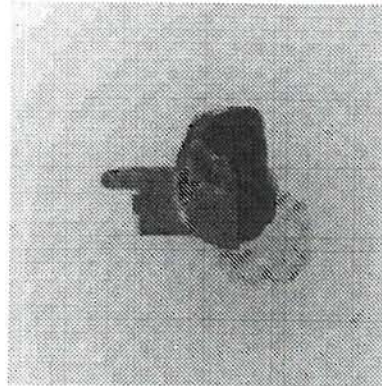


FIG. 43G

Tibial Guide designed to seat on cartilage proximally on the tibia and conform to the bone surface anteriorly.



- 2mm bone cut
- 5° AP Slope
- Perp. Mechanical Axis
- Assumption of 2mm cartilage thickness

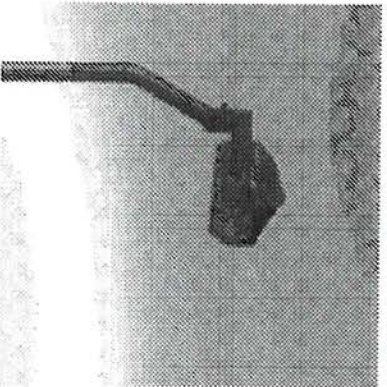
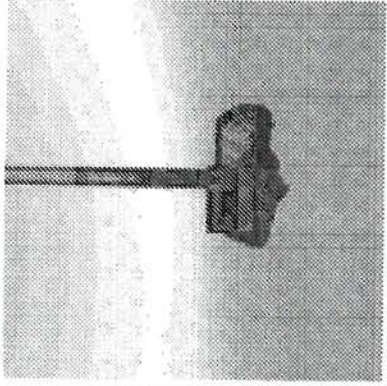
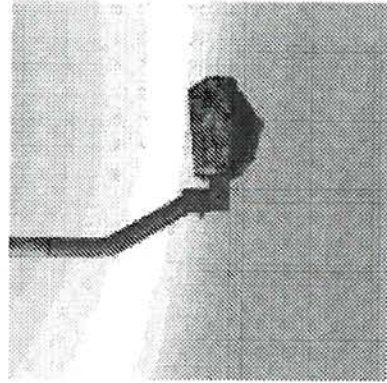
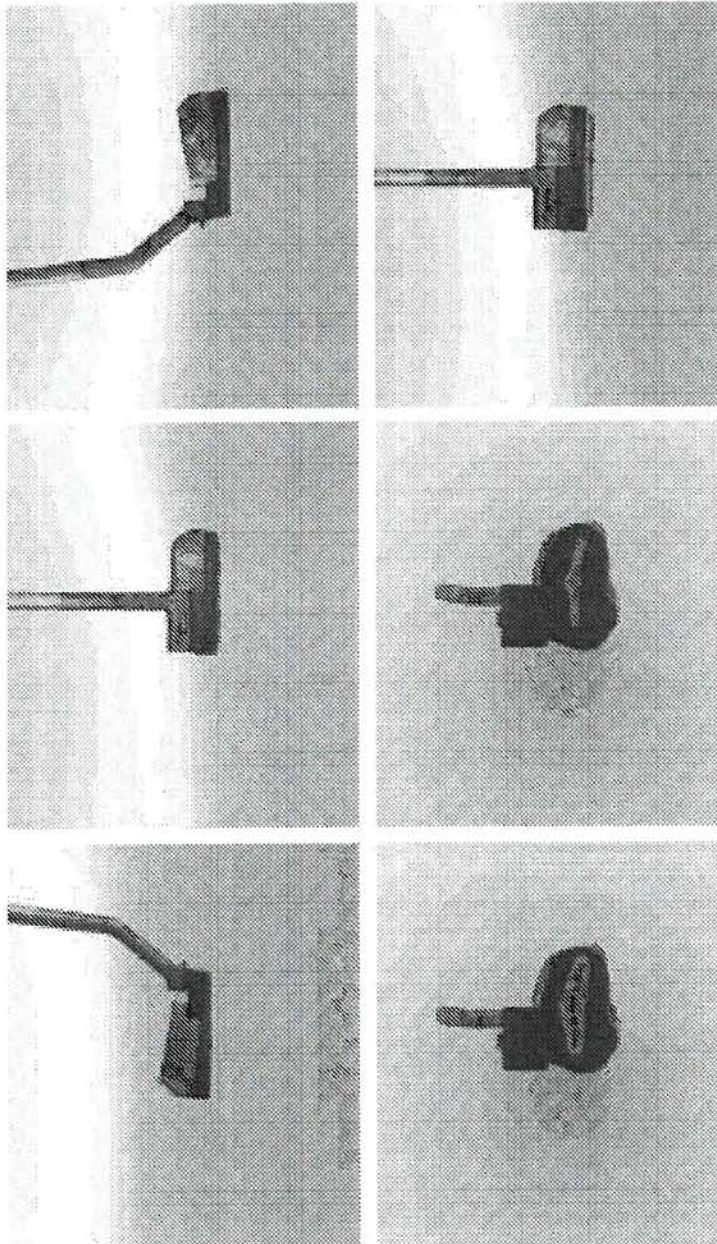


FIG. 44A



- Profile of guide is an exact match to profile of cut tibia
- Stem hole is created using a 14mm drill bit
- Keel Prep Guide seats in the drilled stem hole
- Keel slot is created with 3 holes on each side using 4mm drill bit and an osteotome

FIG. 44B

FIG. 45A

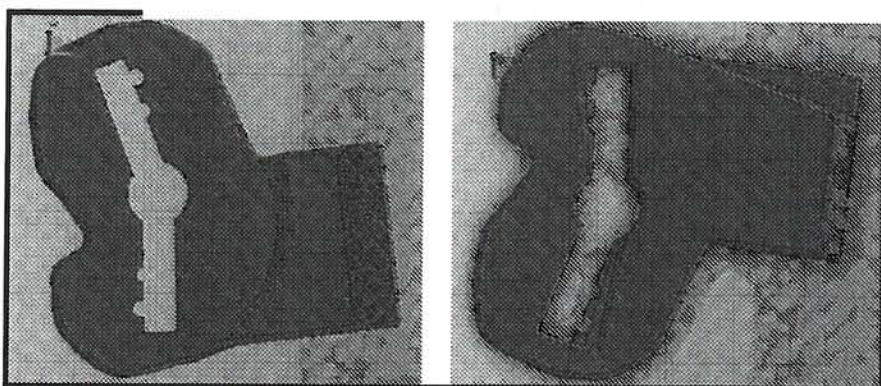


FIG. 45B

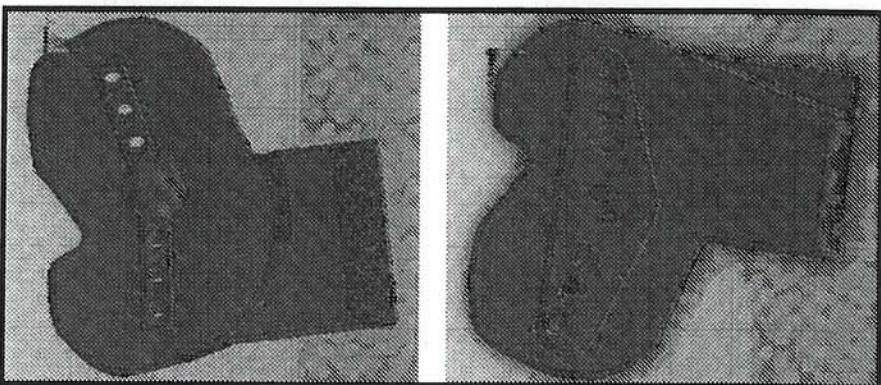


FIG. 45C

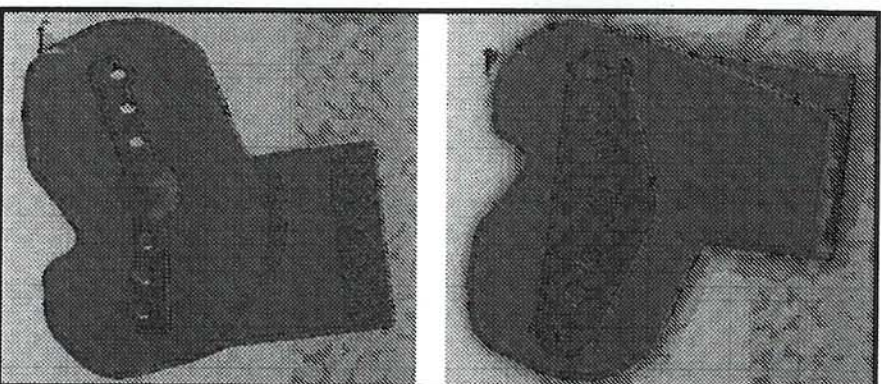


FIG. 45D

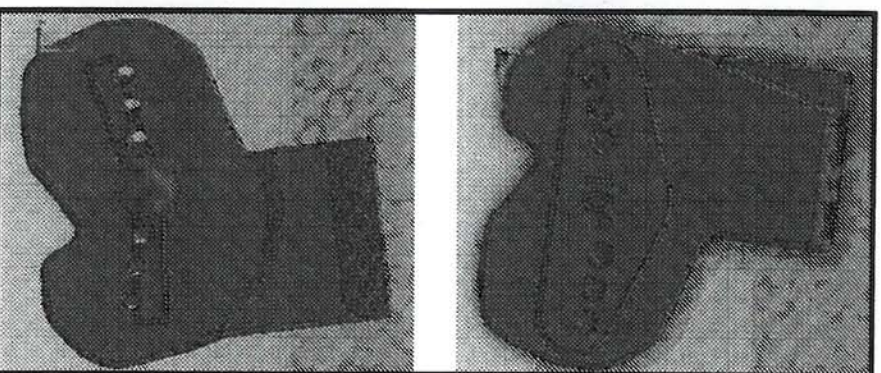


FIG. 46A

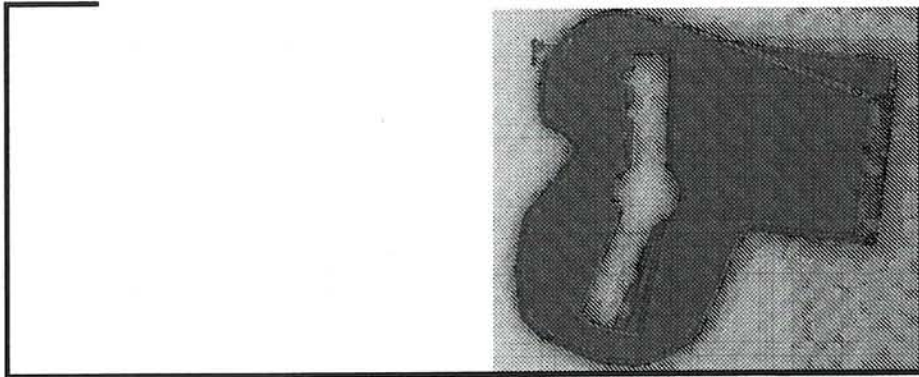


FIG. 46B

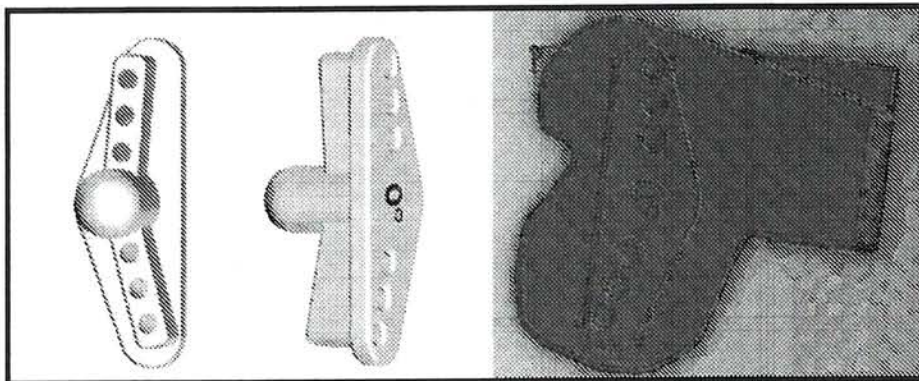


FIG. 46C

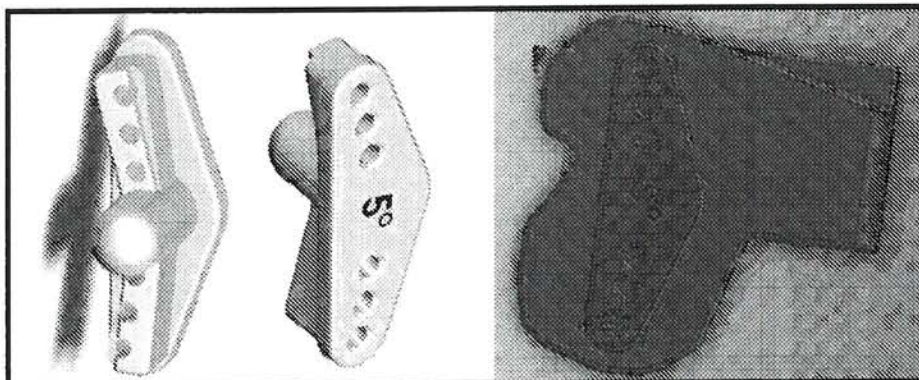
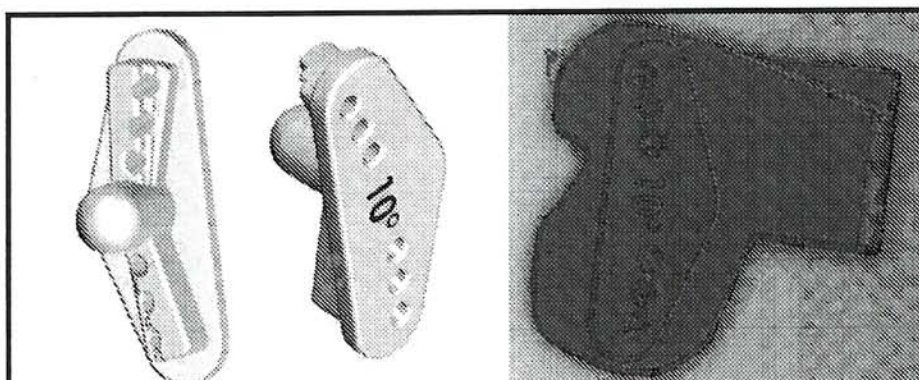


FIG. 46D



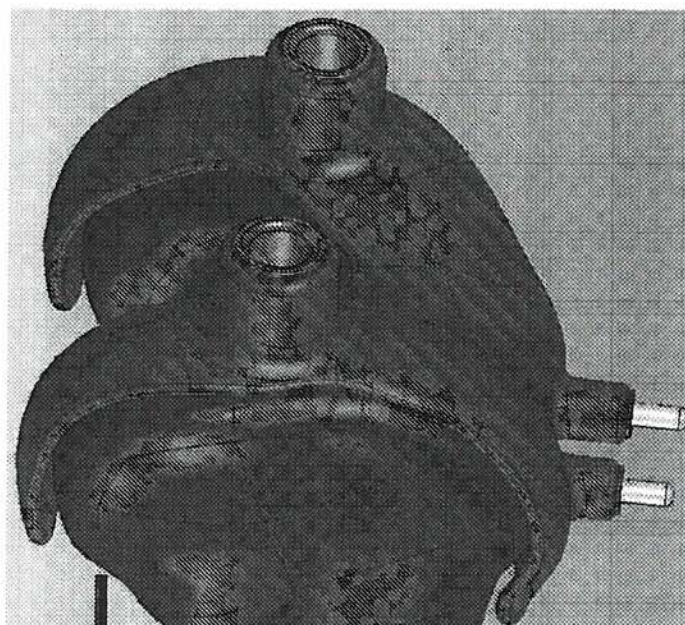


FIG. 47A

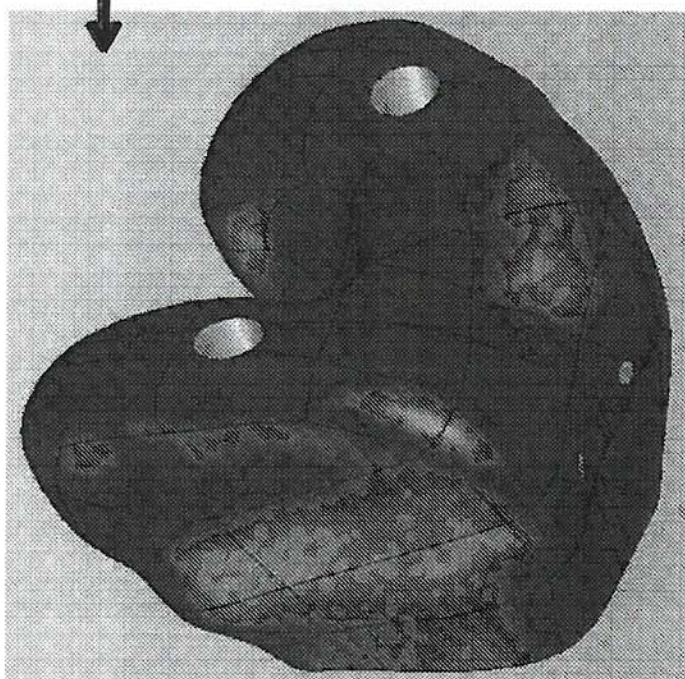


FIG. 47B

FIG. 48A

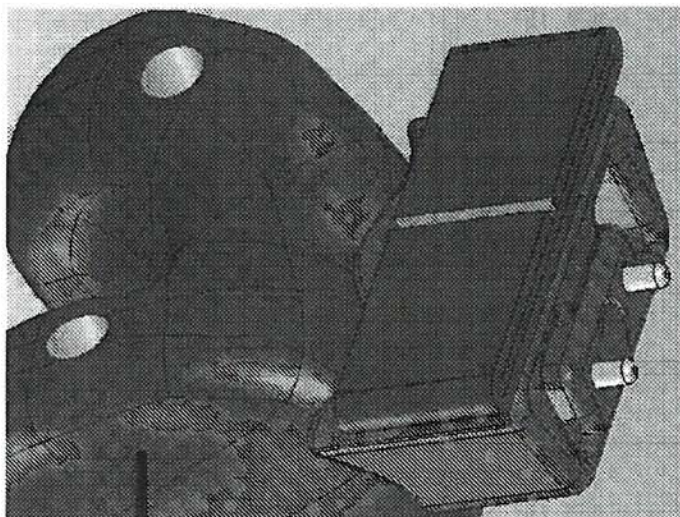
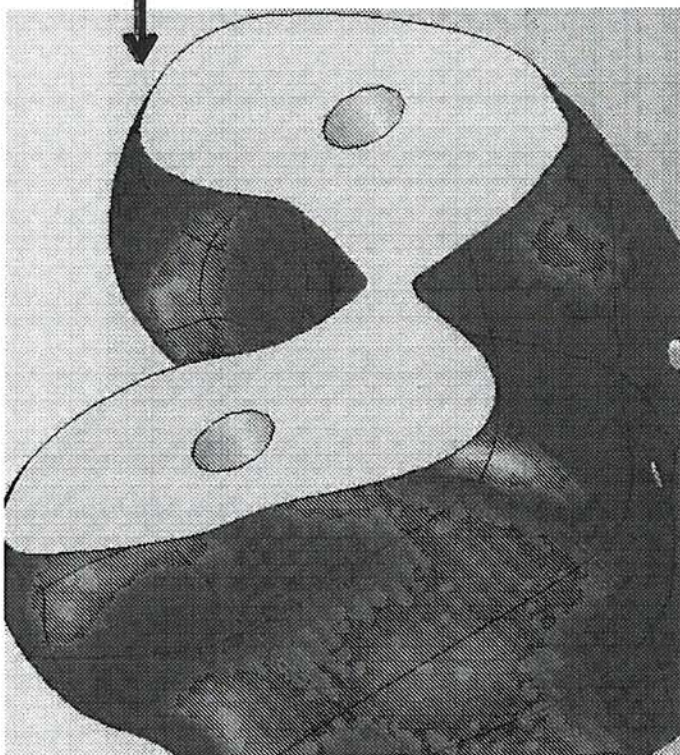


FIG. 48B



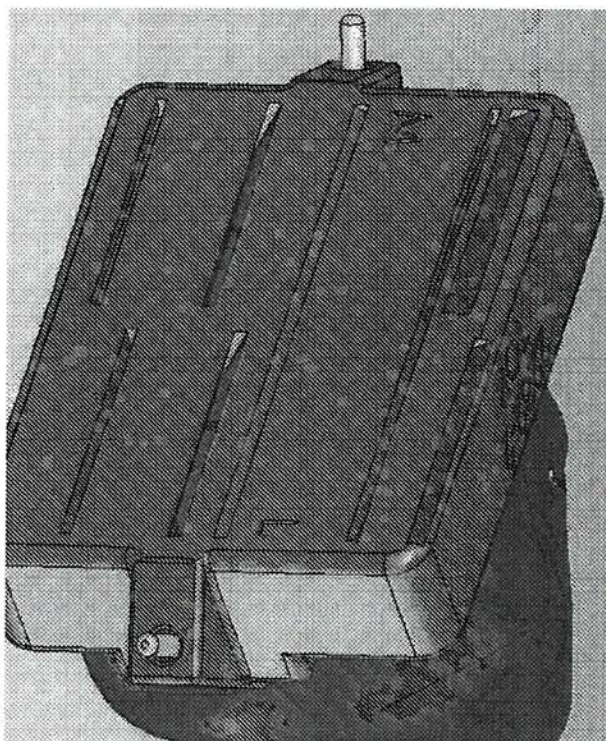


FIG. 49A

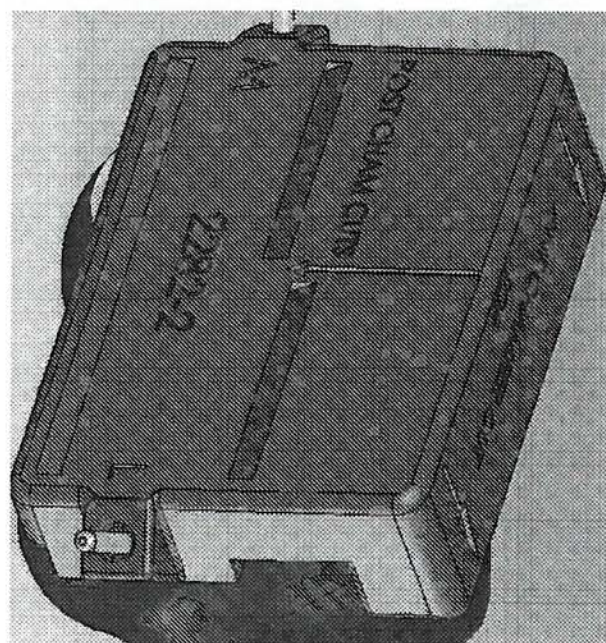
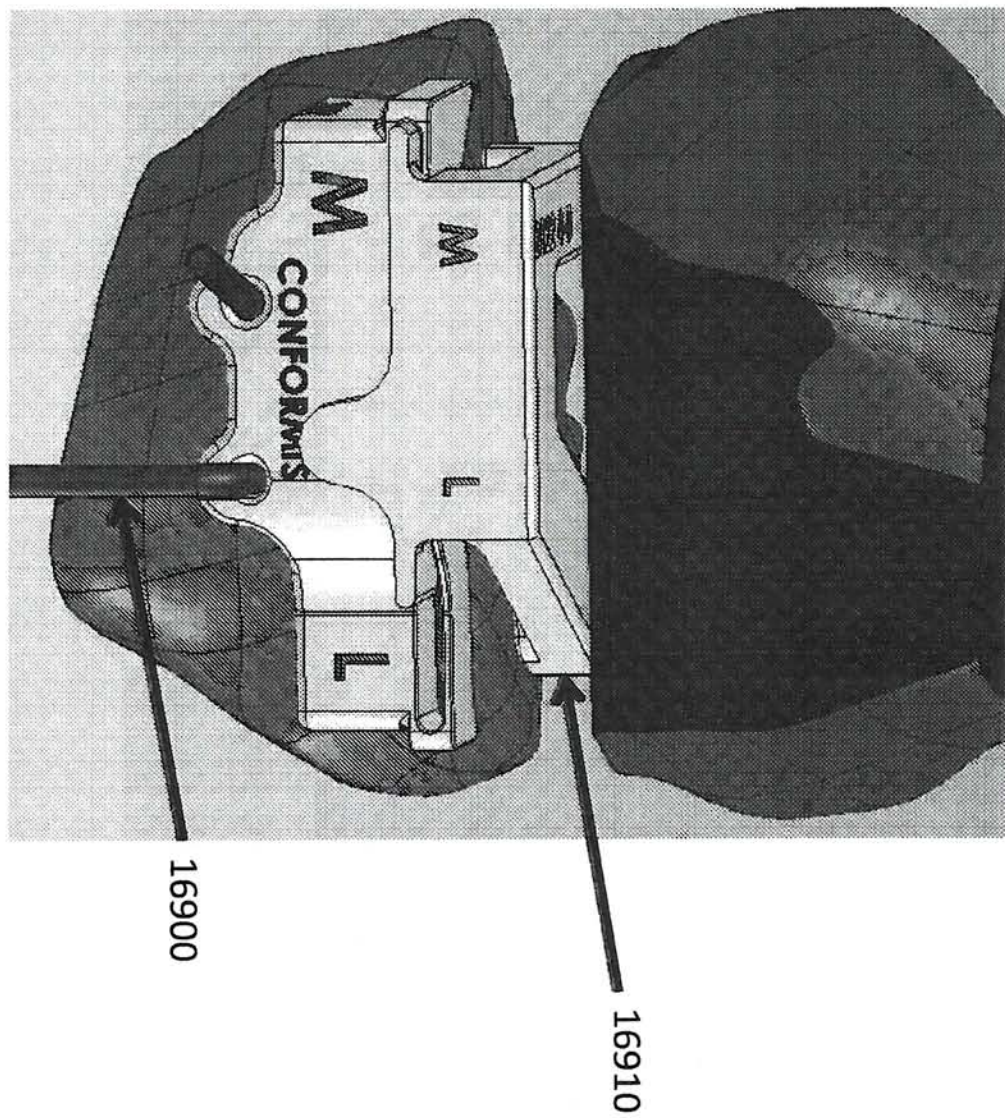


FIG. 49B

FIG. 50A



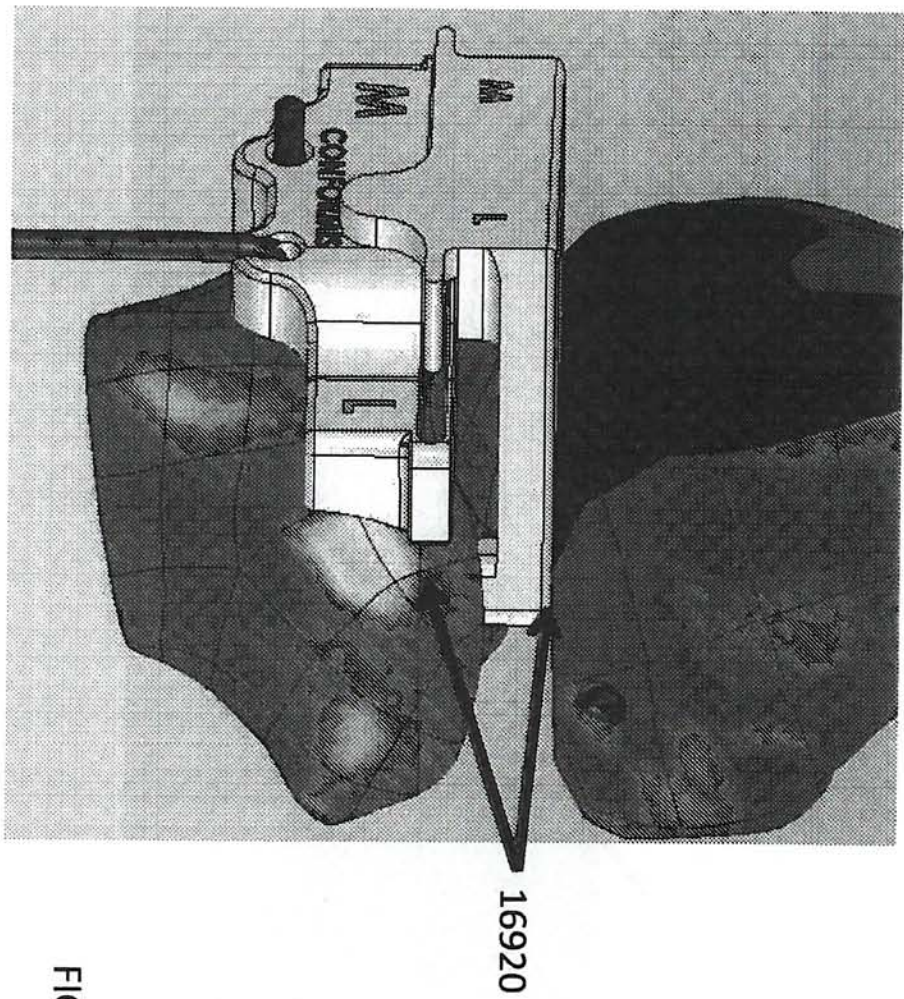


FIG. 50B

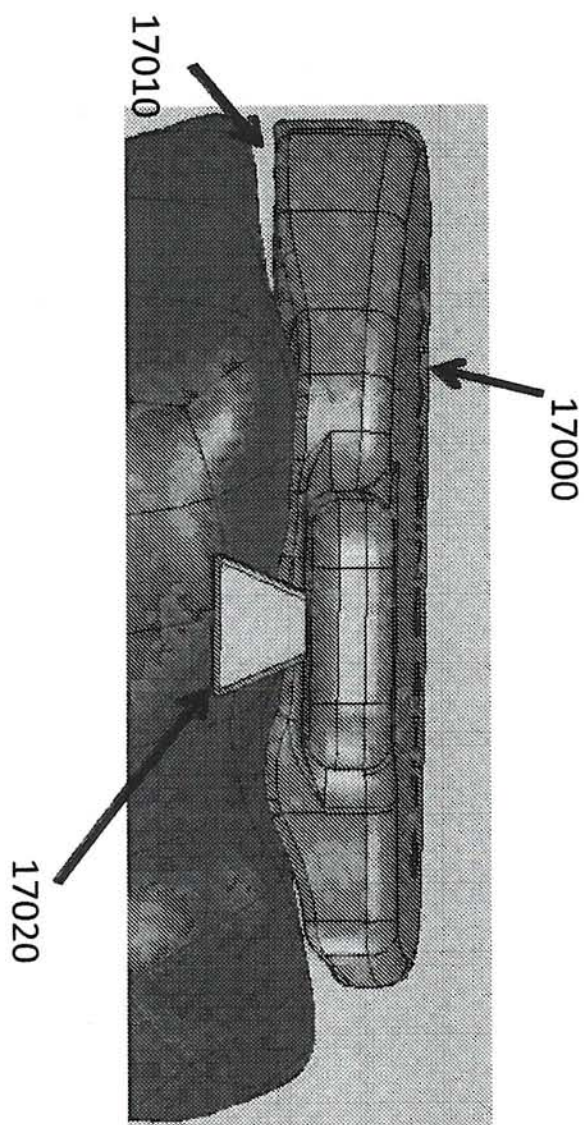
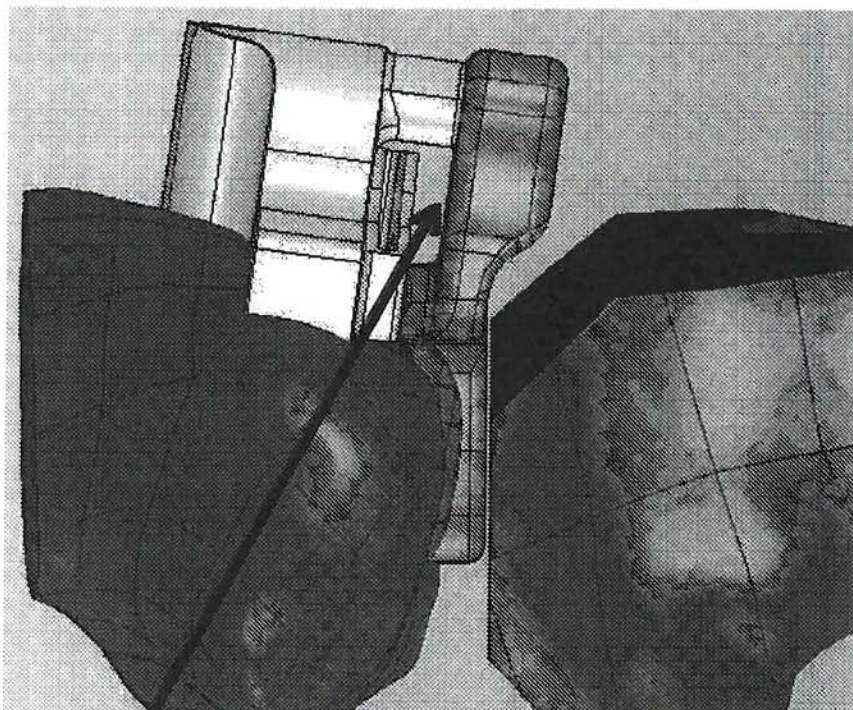


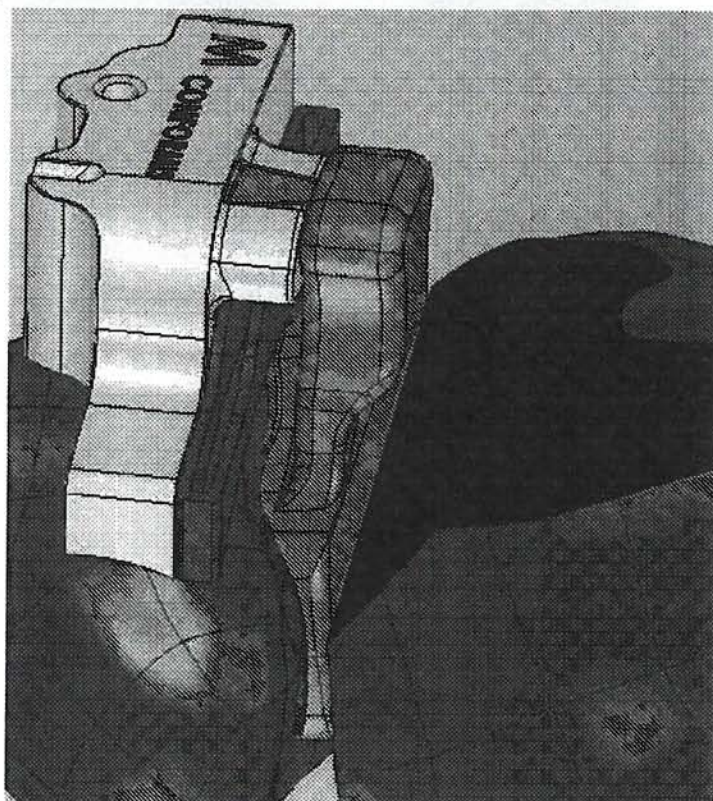
FIG. 51

FIG. 52A



17100

FIG. 52B



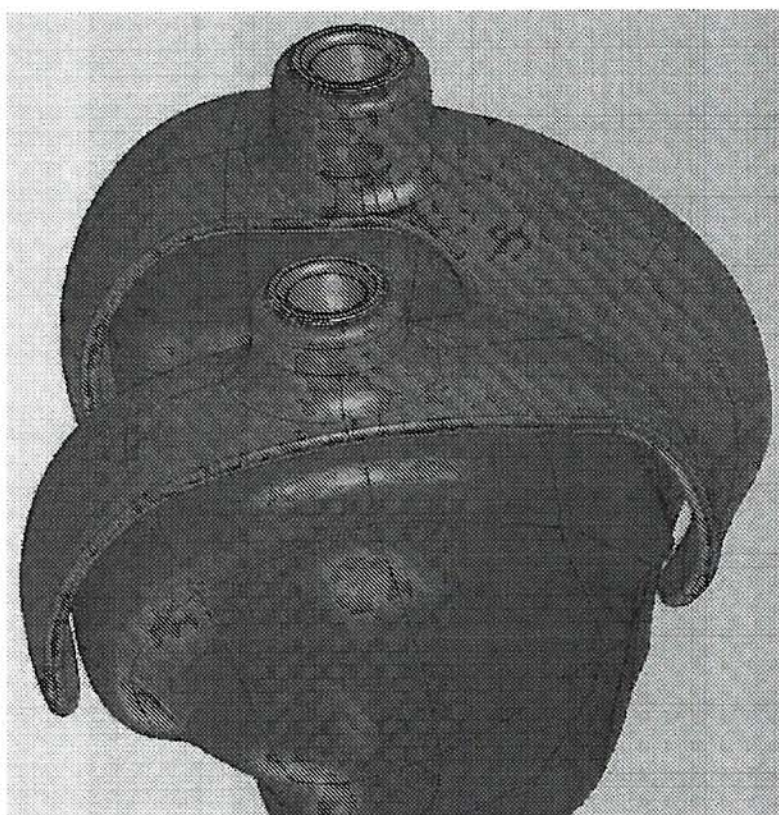
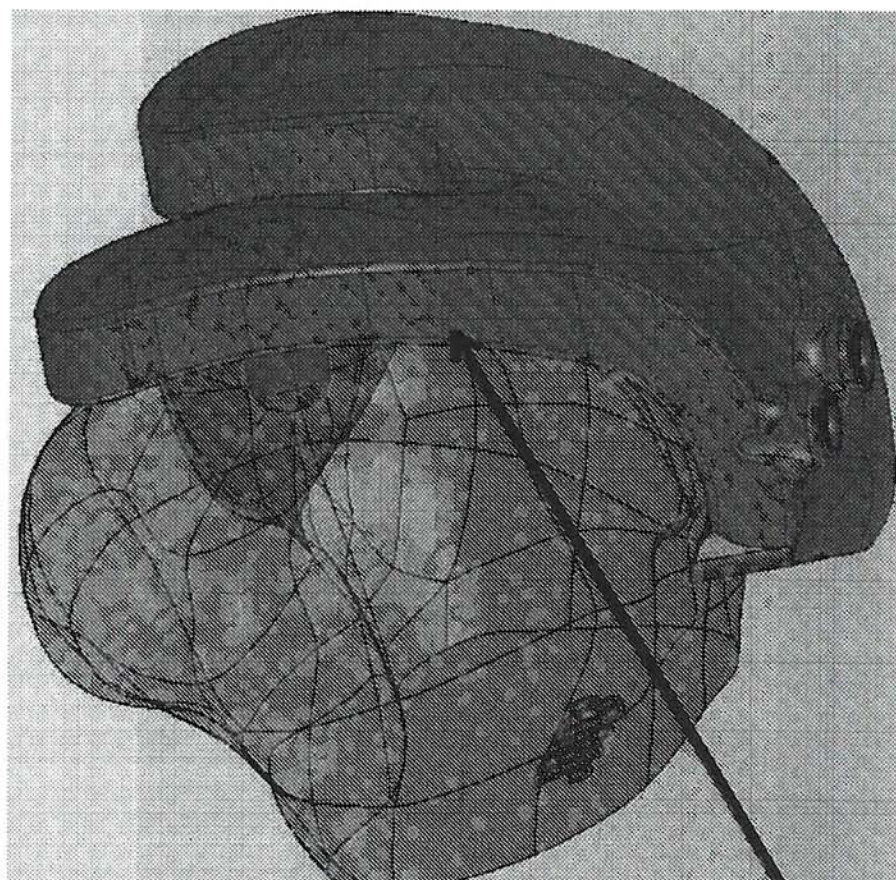


FIG. 53



17300

FIG. 54

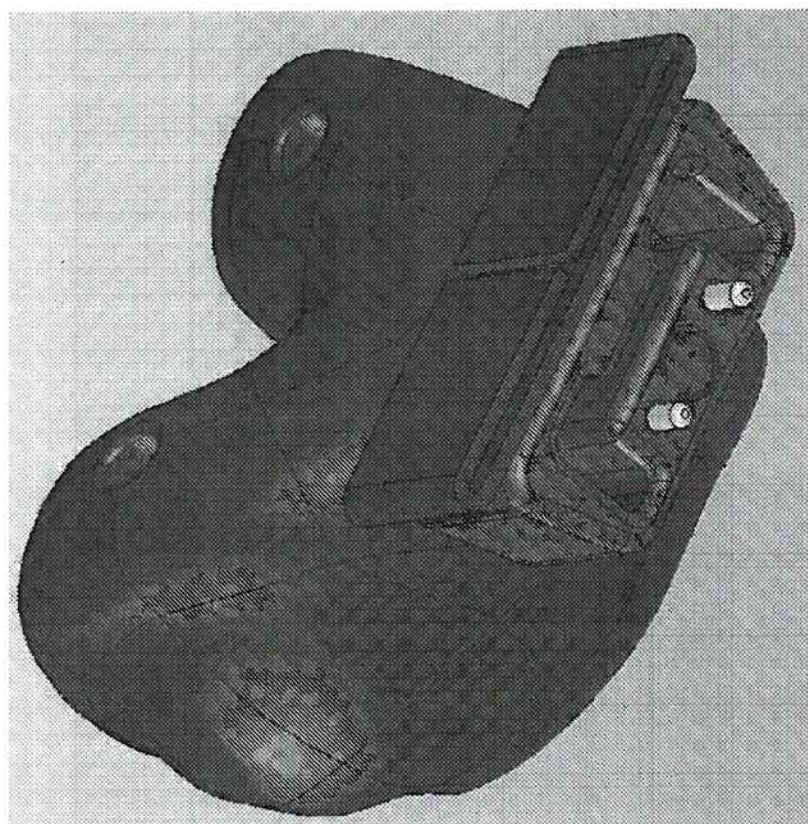
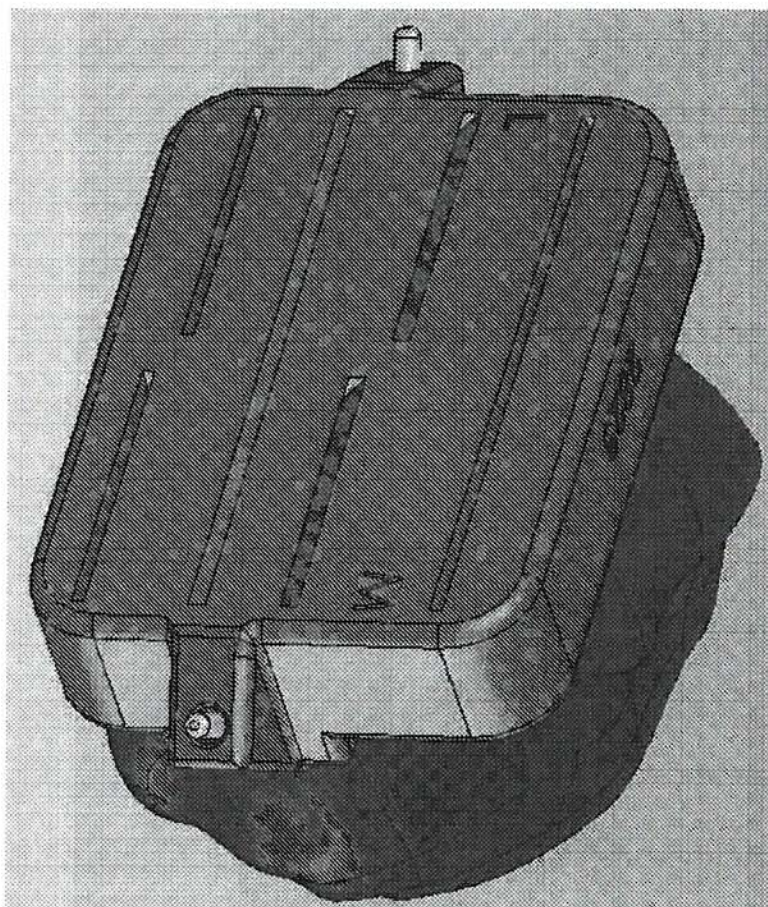


FIG. 55

FIG. 56



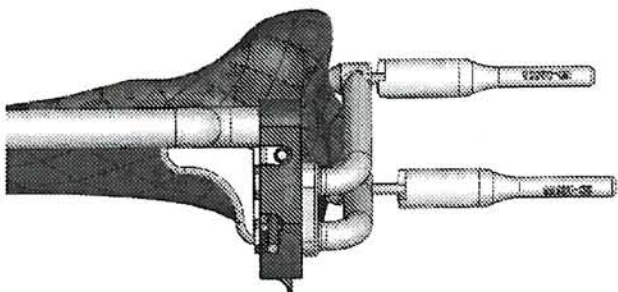


FIG. 57A

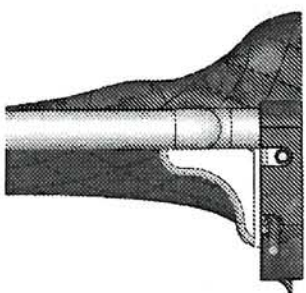


FIG. 57B

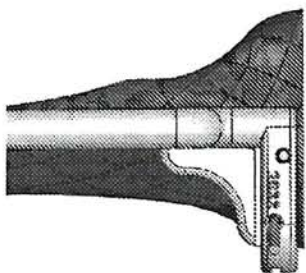


FIG. 57C

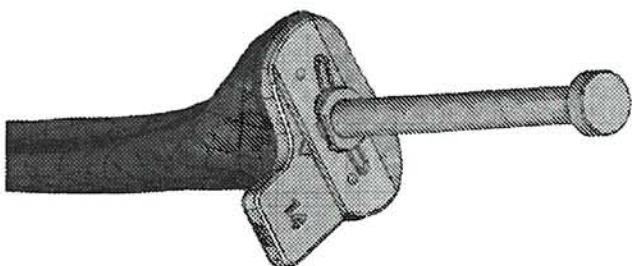


FIG. 57D

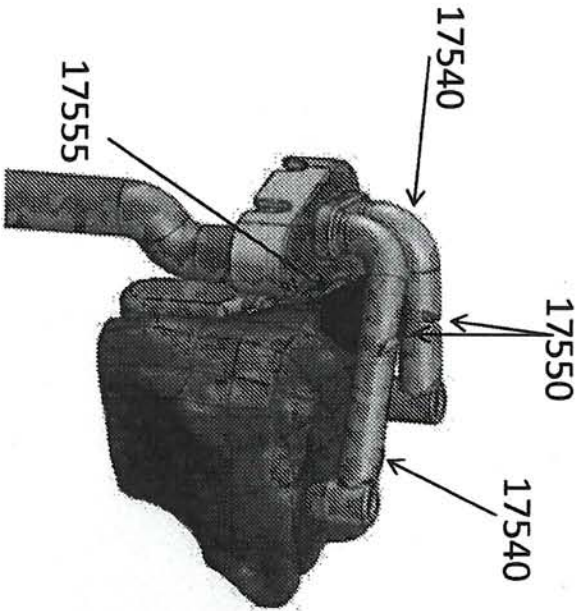


FIG. 57E

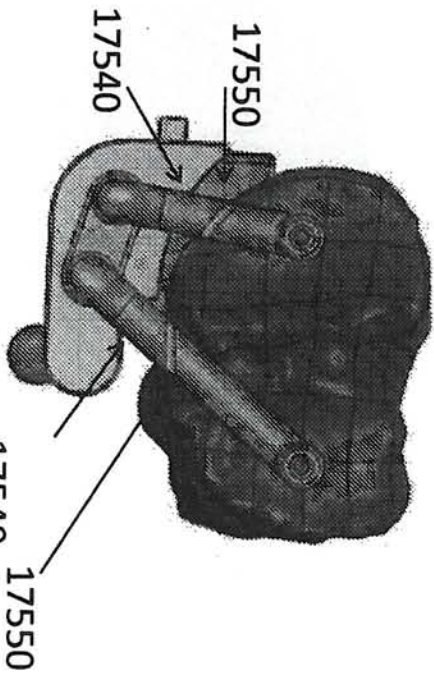
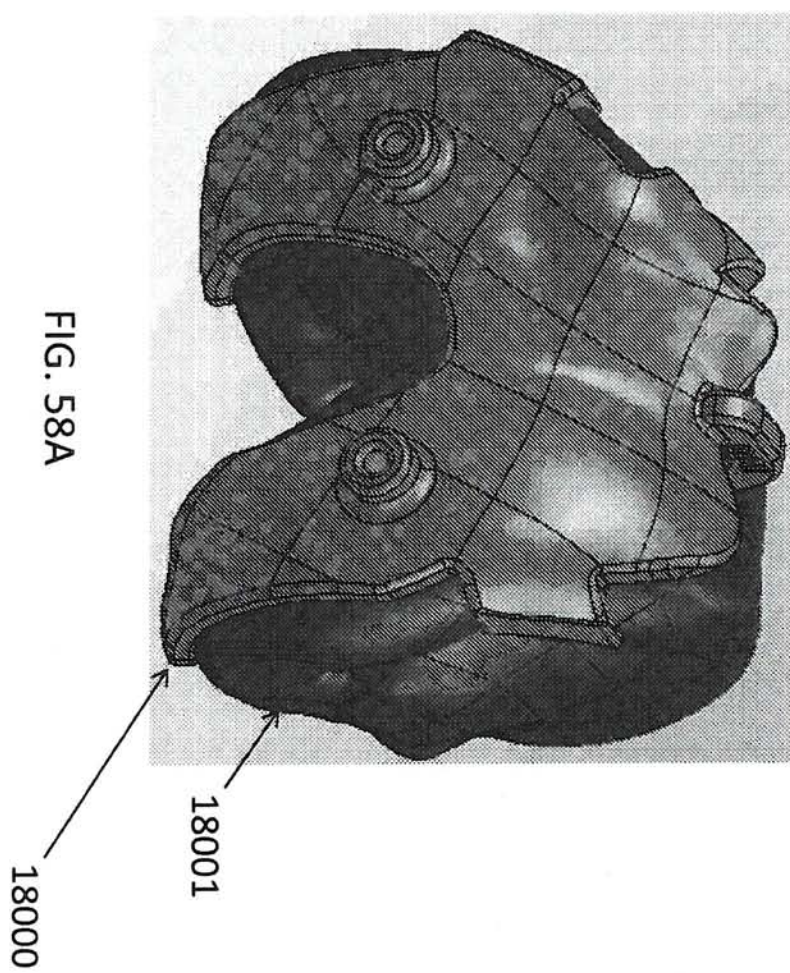


FIG. 57F



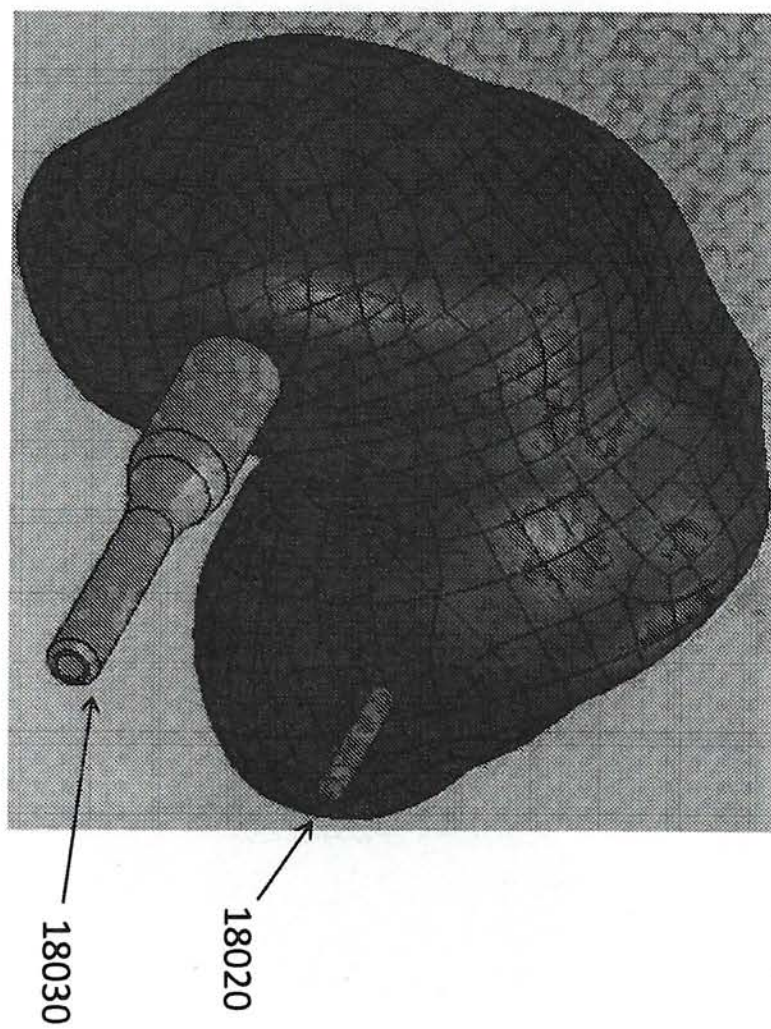


FIG. 58B

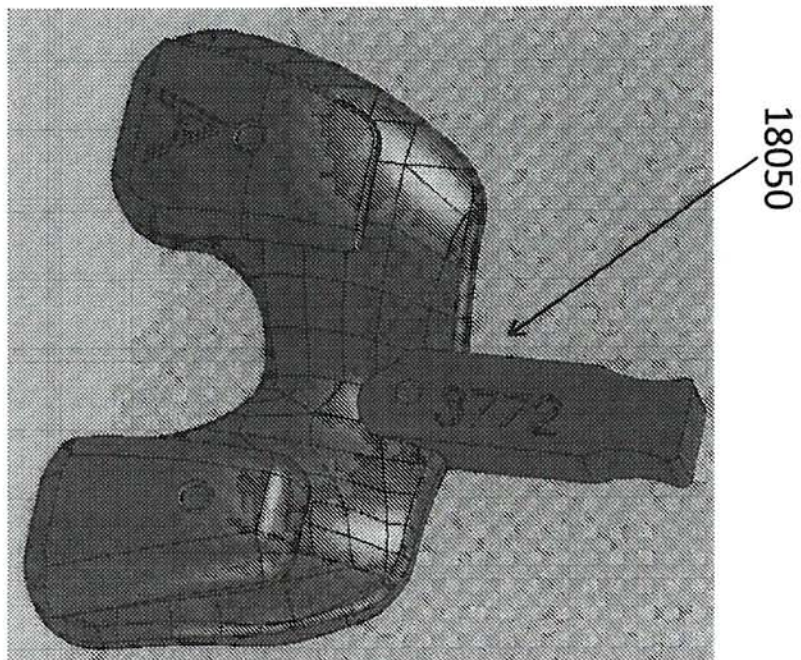


FIG. 58C

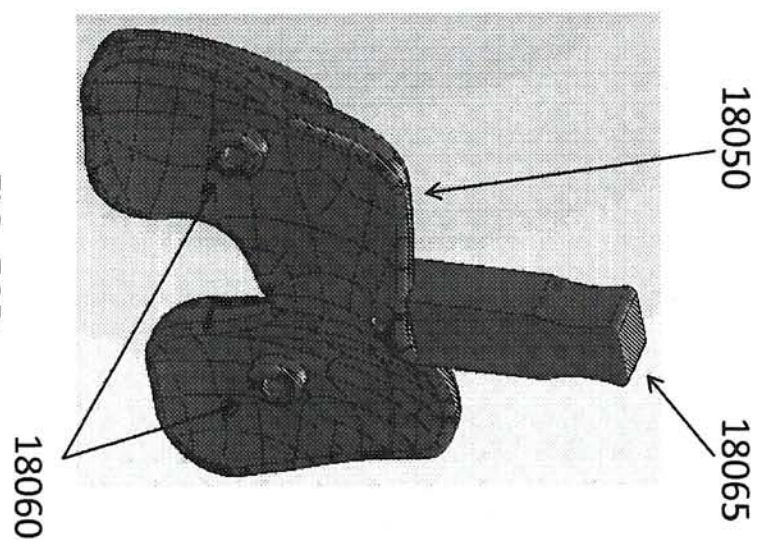


FIG. 58D

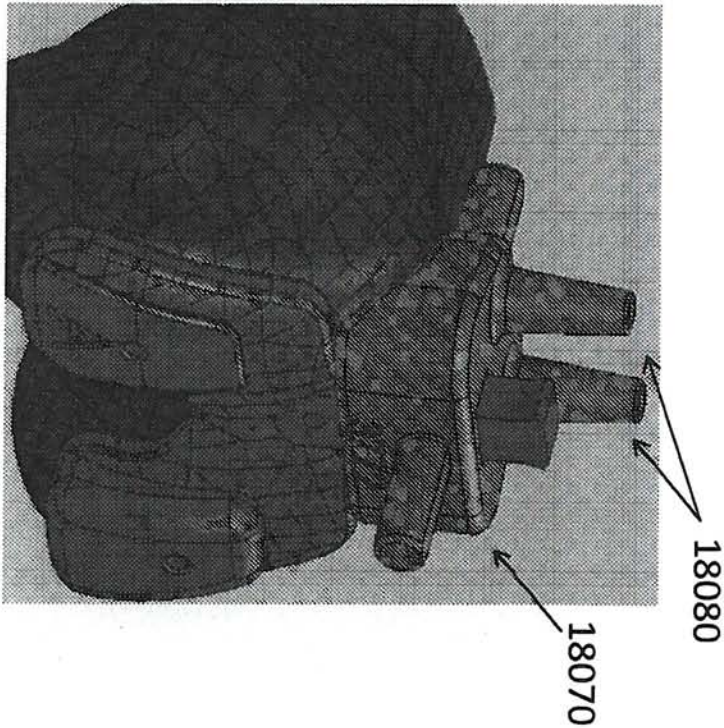
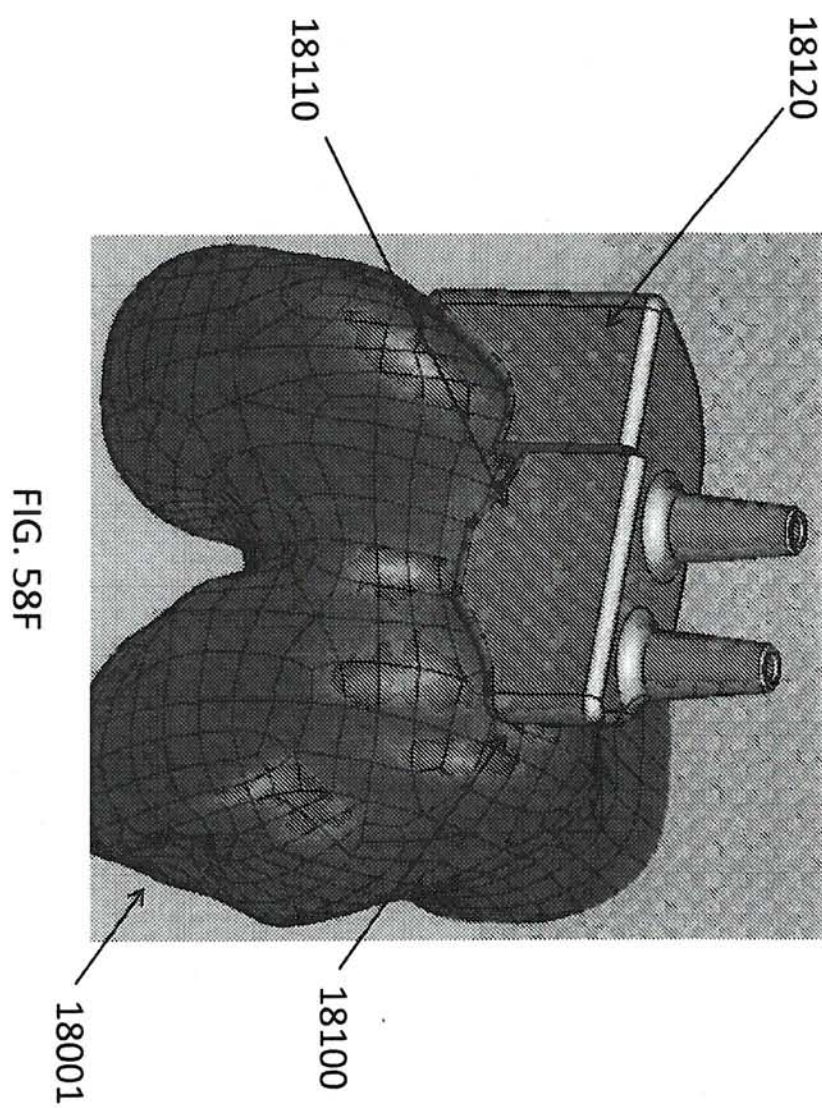
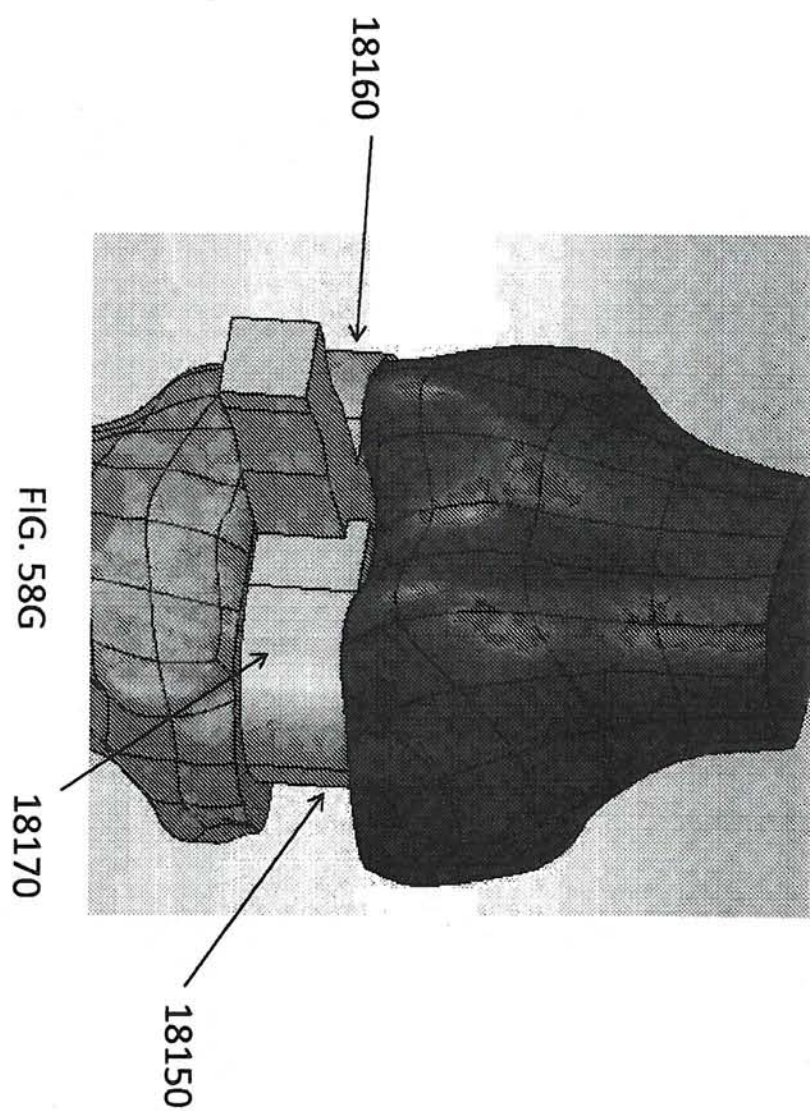
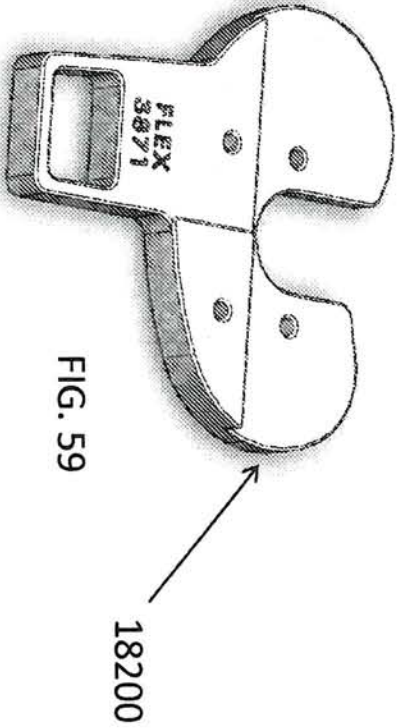
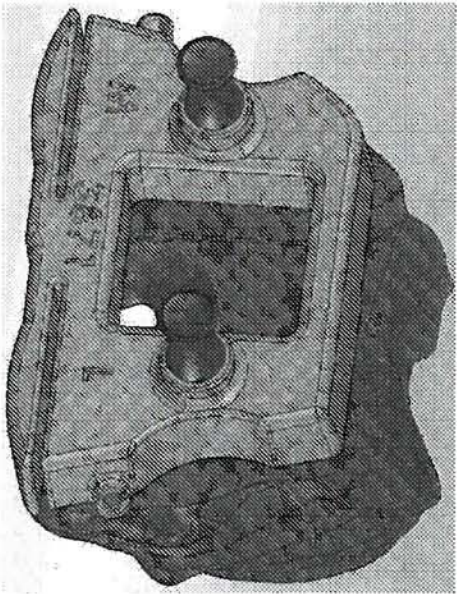
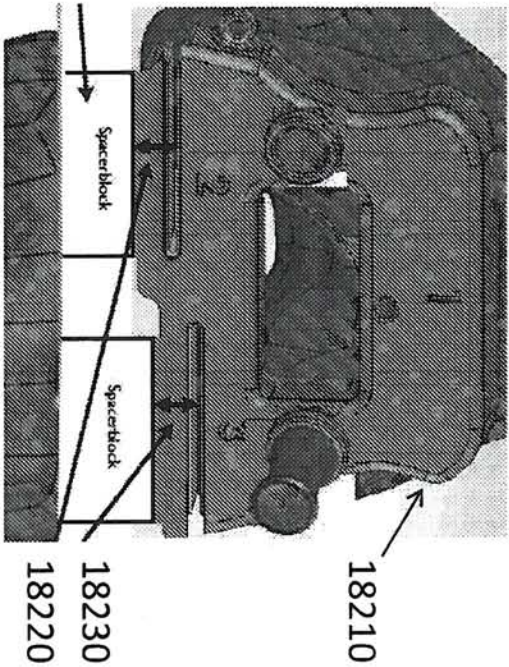


FIG. 58E







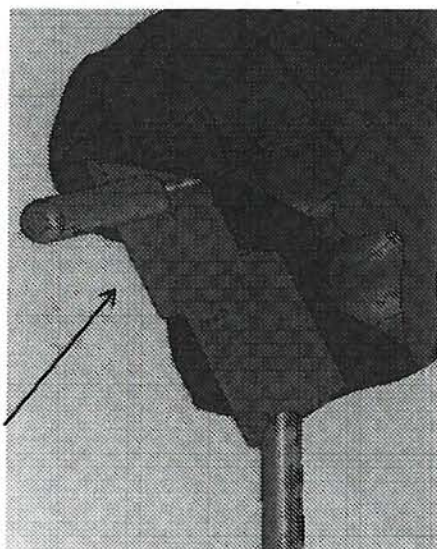


FIG. 58J

18250

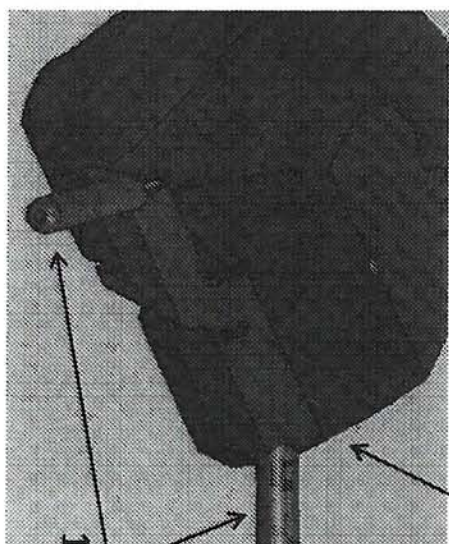


FIG. 58K

18260

18270

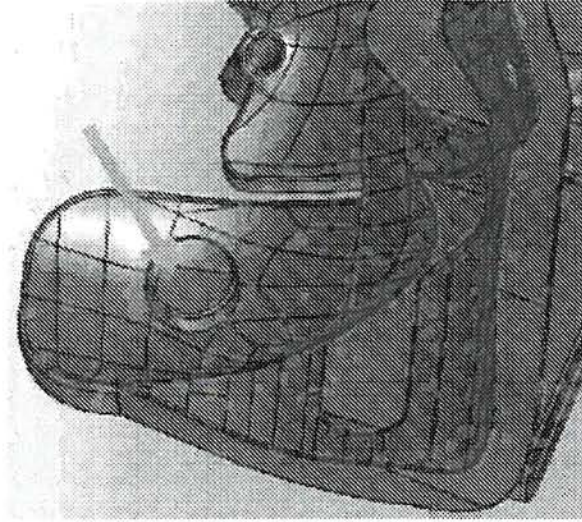


FIG. 60A

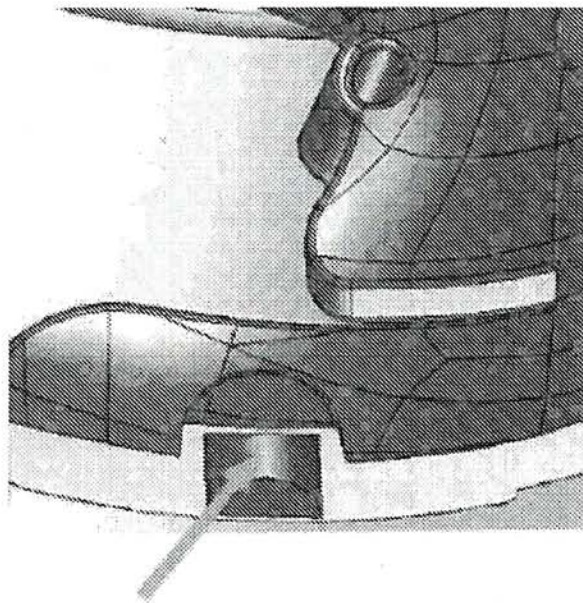


FIG. 60B

FIG. 60C

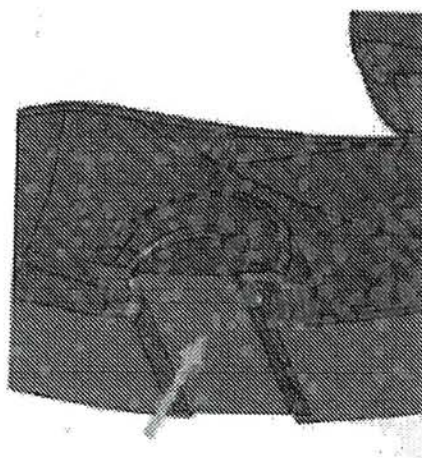


FIG. 61A

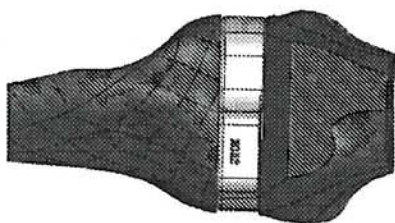
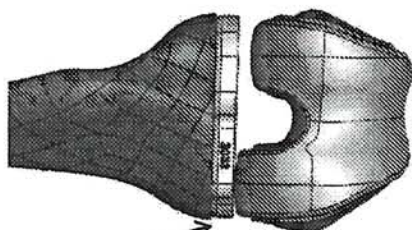
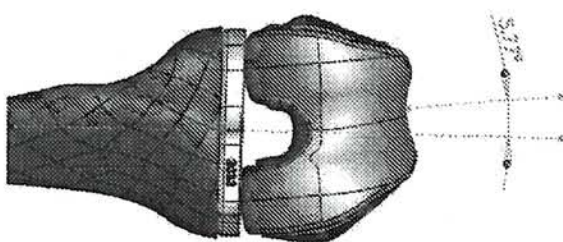


FIG. 61B



18300

FIG. 61C



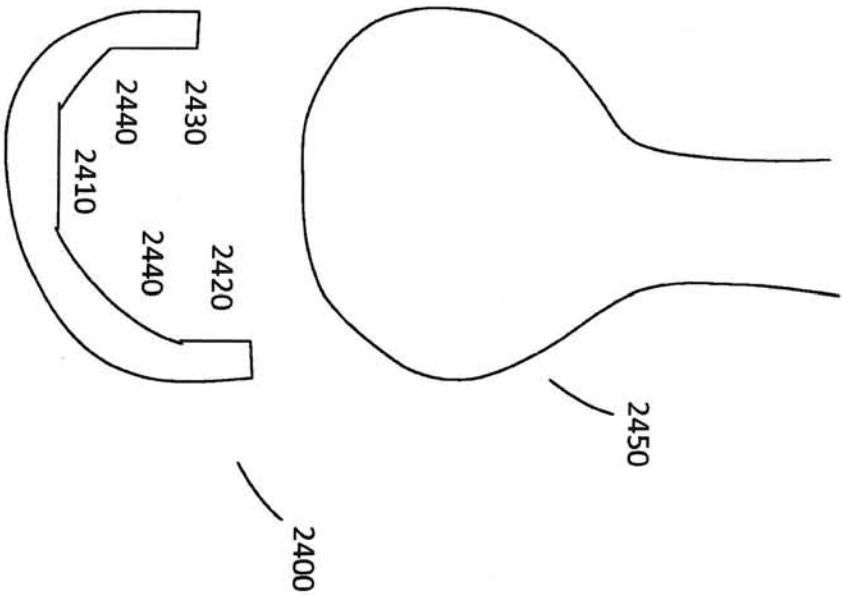
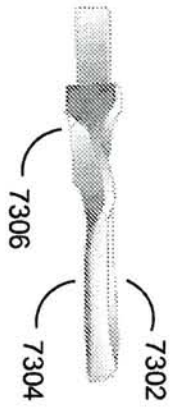


FIG. 62



FIG. 63A



7302
7304
7306

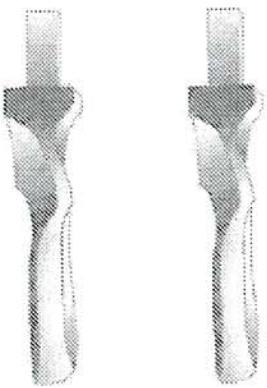


FIG. 63B

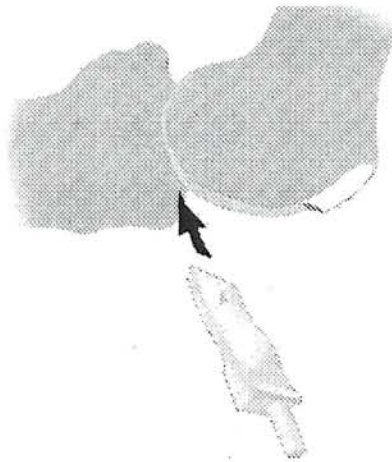


FIG. 63C

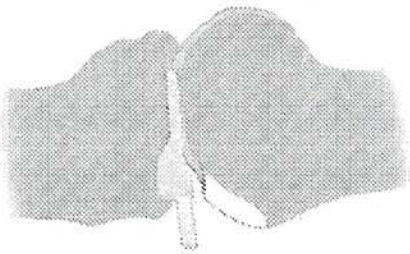


FIG. 63D

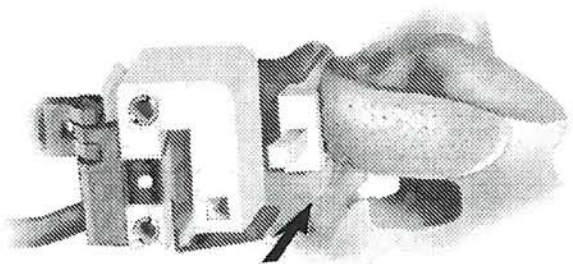


FIG. 63E

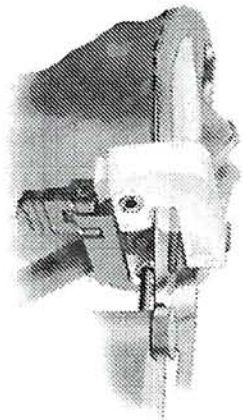


FIG. 63F

FIG. 64A

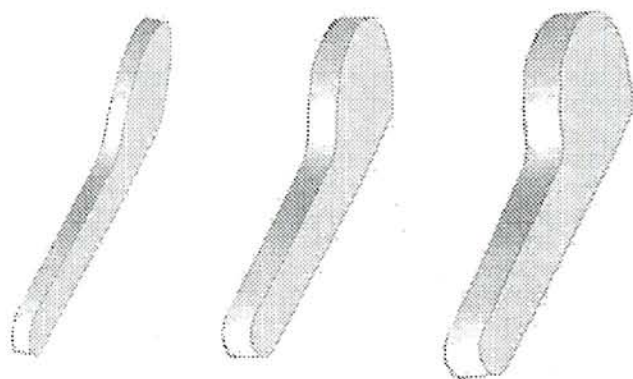


FIG. 64B

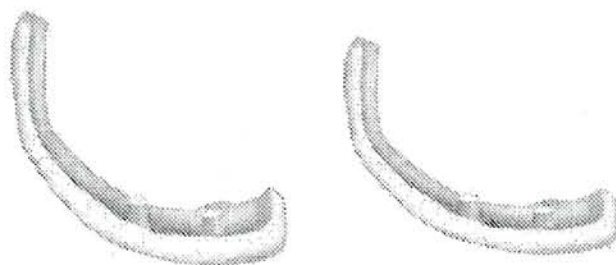


FIG. 64C

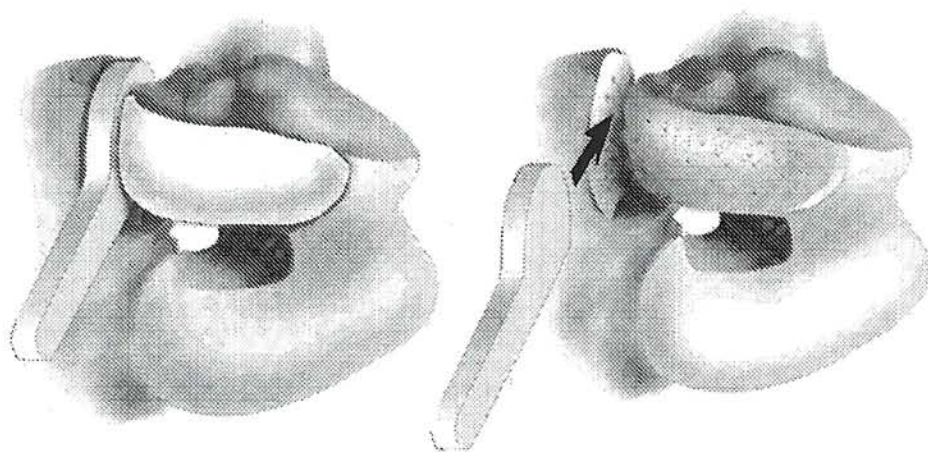




FIG. 65A

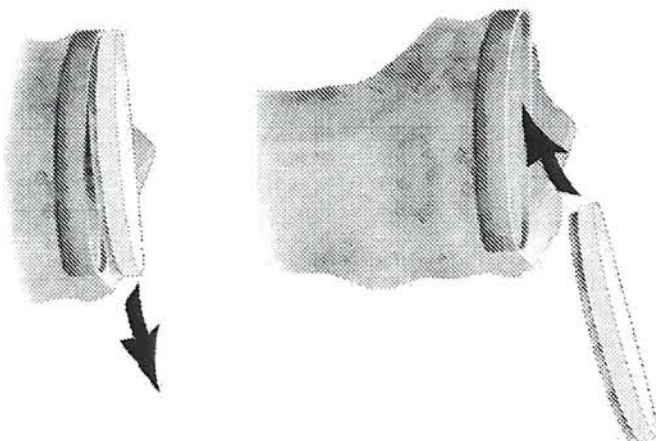


FIG. 65B

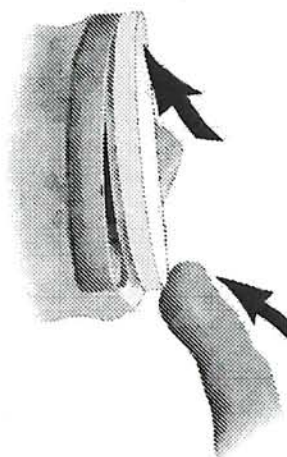


FIG. 65C

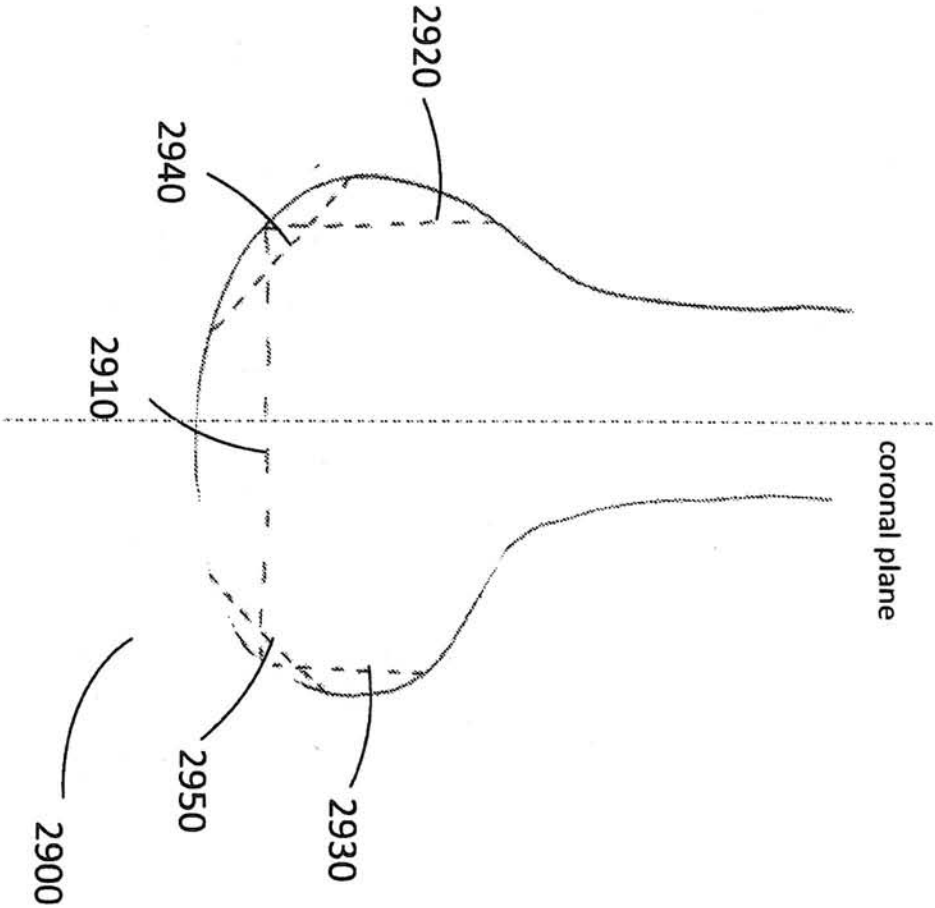


FIG. 66
(Prior Art)

FIG. 67A - Side view of implant

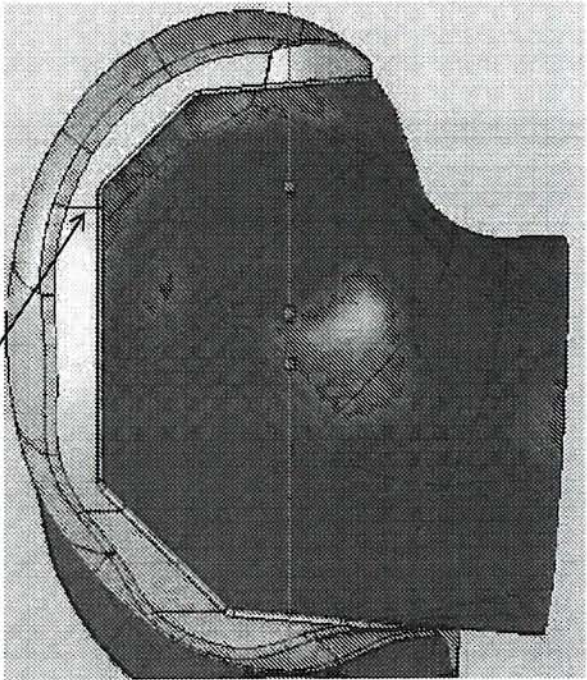
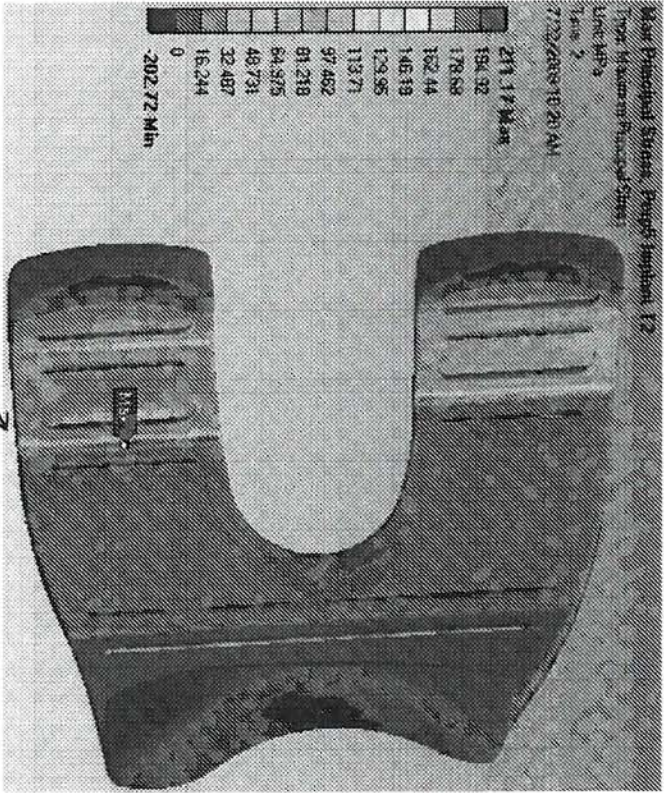


FIG. 67B - FEA Analysis



3100

5 Cuts Perpendicular

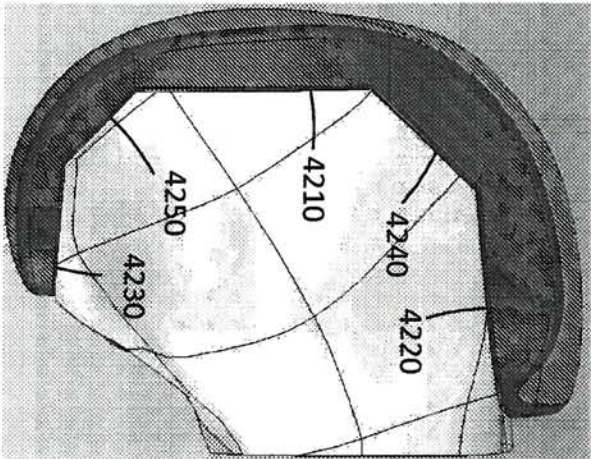


FIG. 68A

6 Cuts Perpendicular

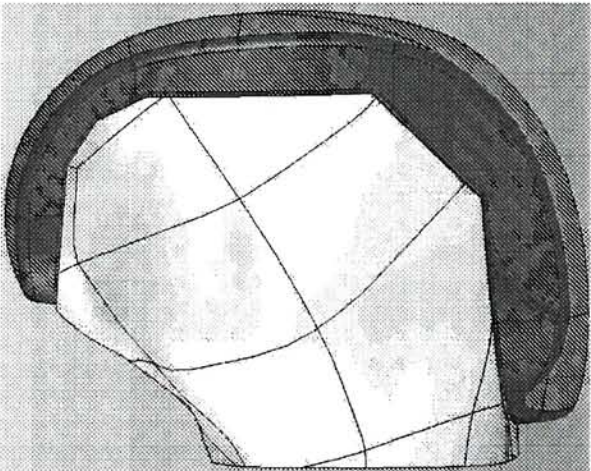


FIG. 68B

6 Cuts Flexed 5 degrees

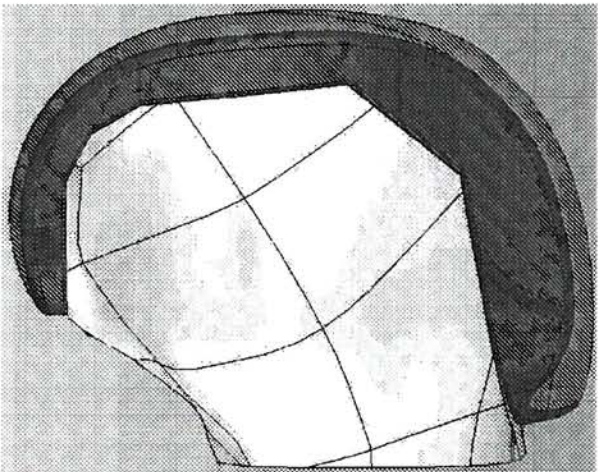


FIG. 68C

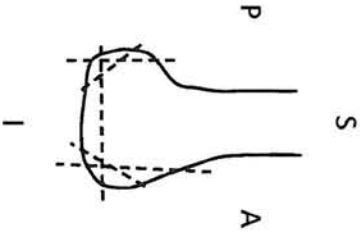


FIG. 69A

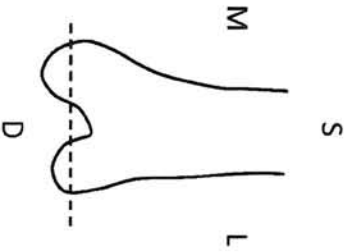


FIG. 69C

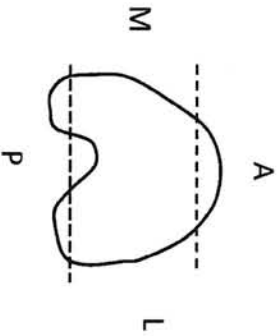


FIG. 69E

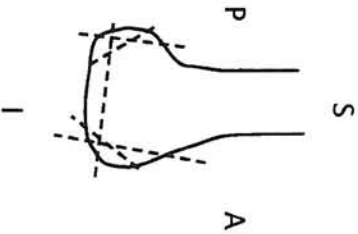


FIG. 69B

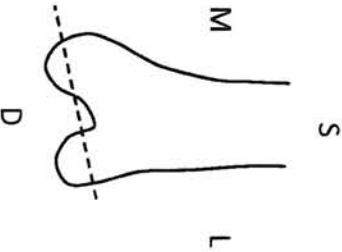


FIG. 69D

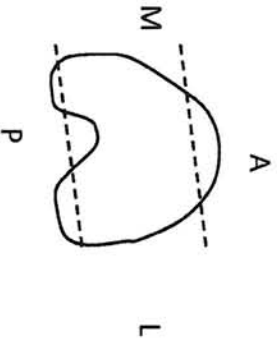


FIG. 69F

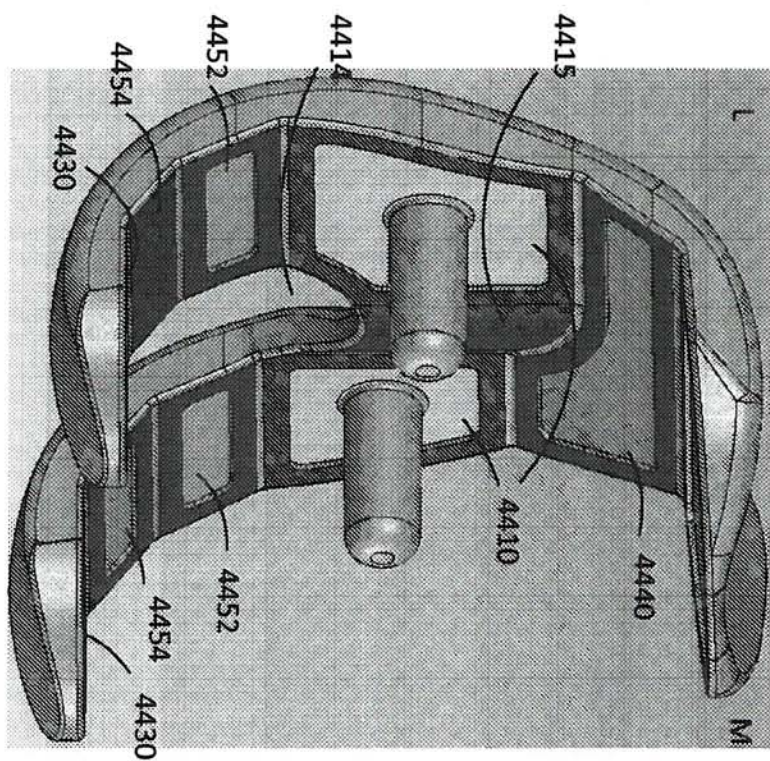


FIG. 70A

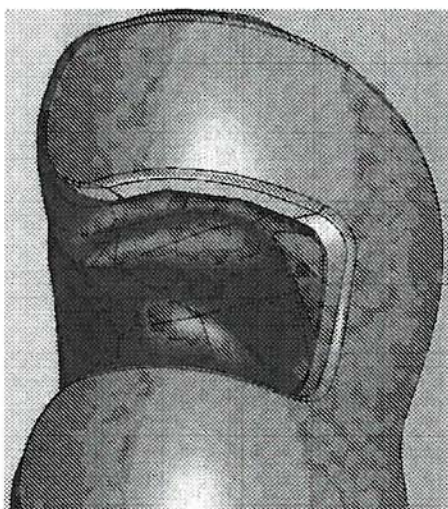


FIG. 70B

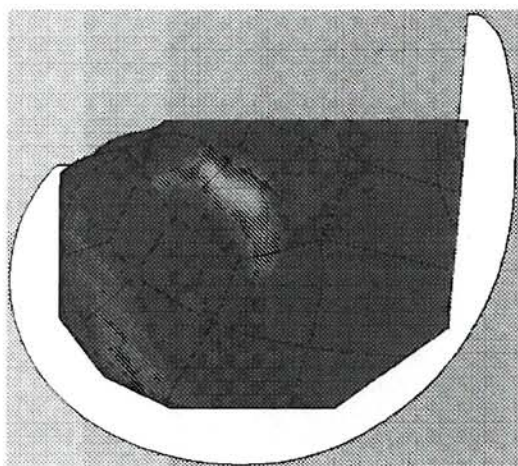


FIG. 70C

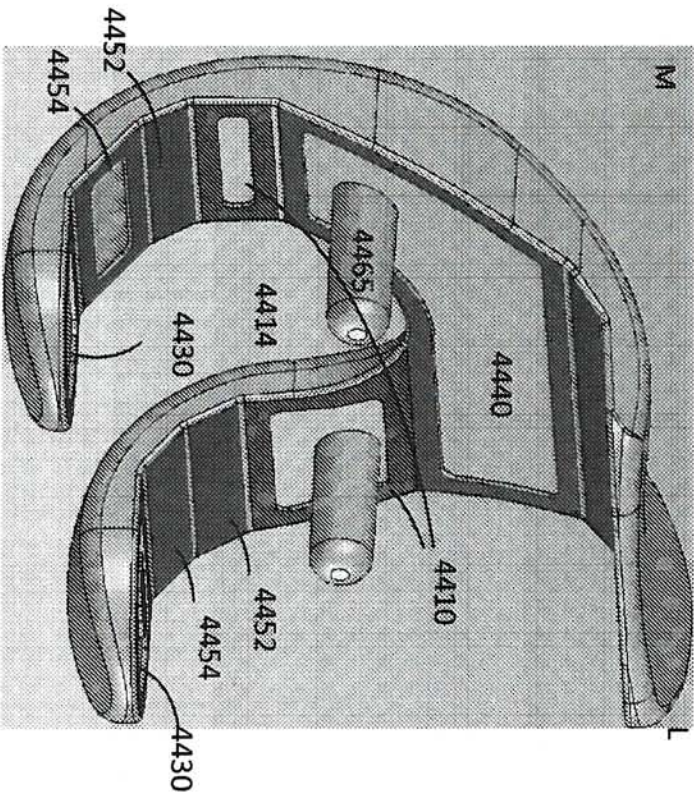


FIG. 71A

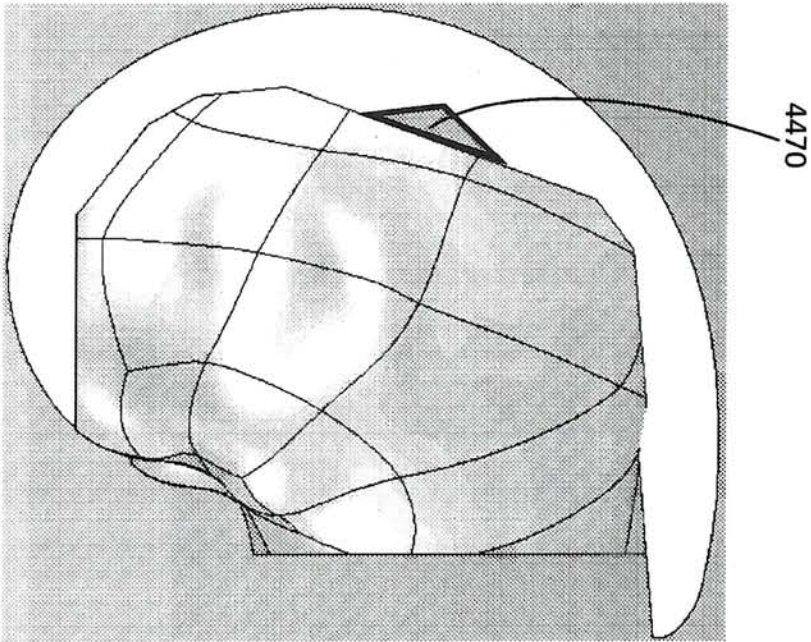


FIG. 71B

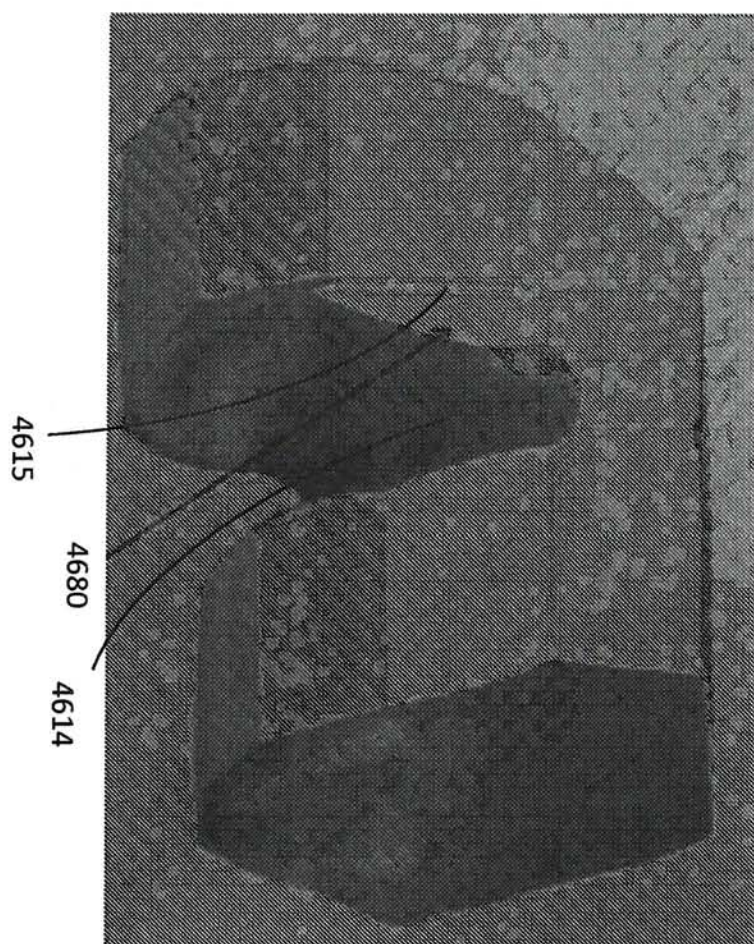


FIG. 72

FIG. 73A

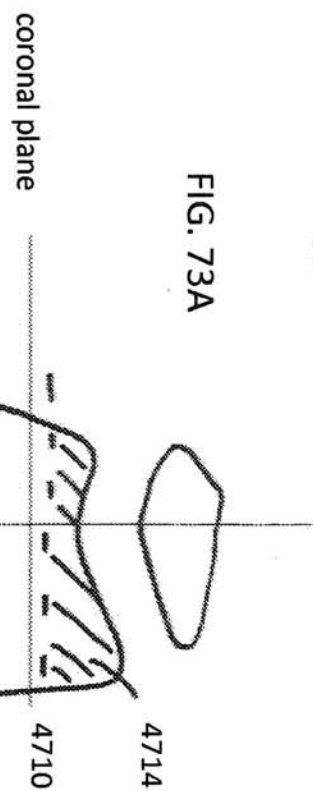


FIG. 73B

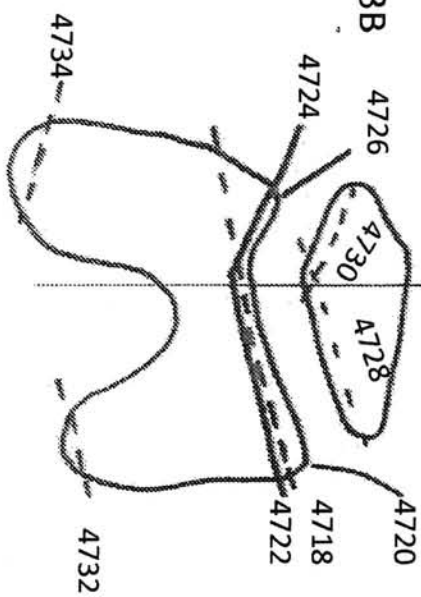
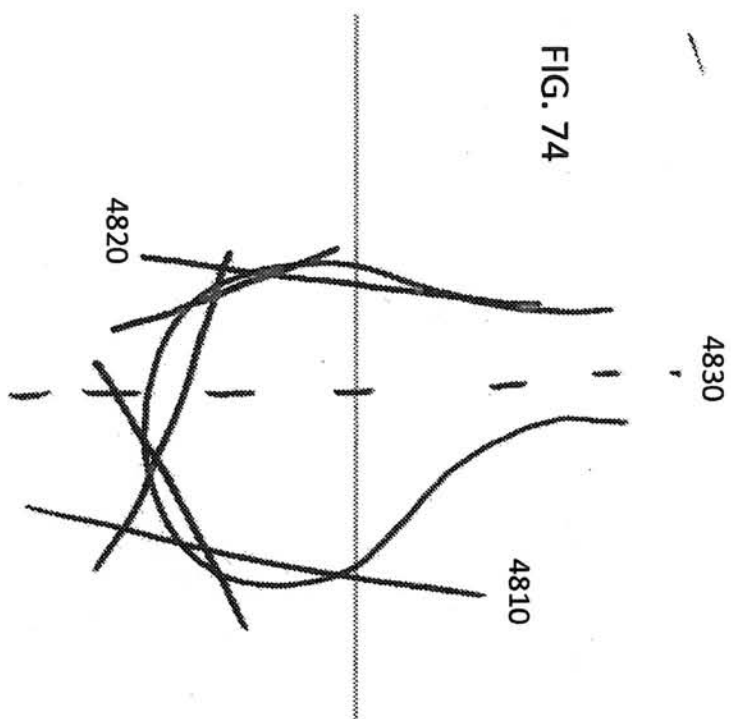


FIG. 74



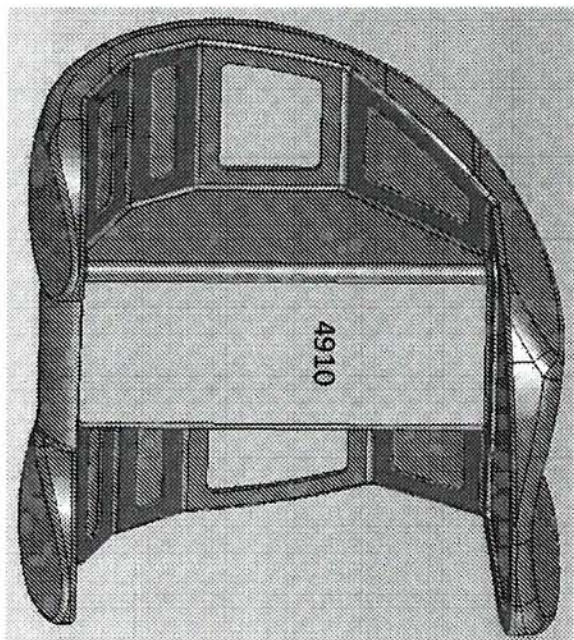


FIG. 75A

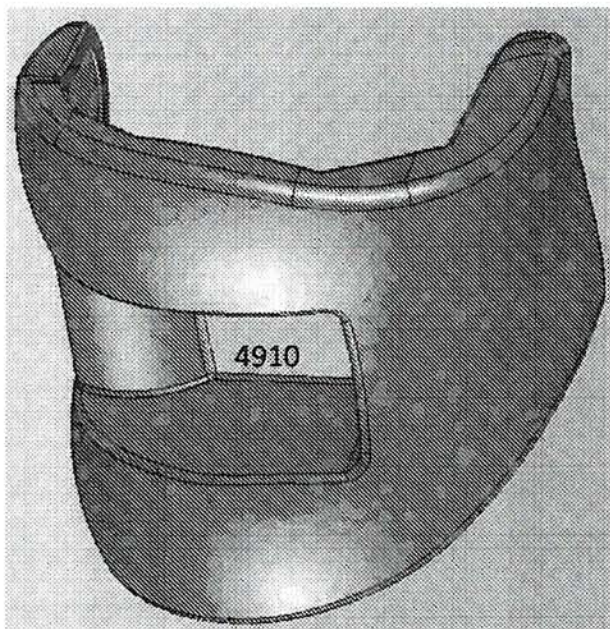


FIG. 75B

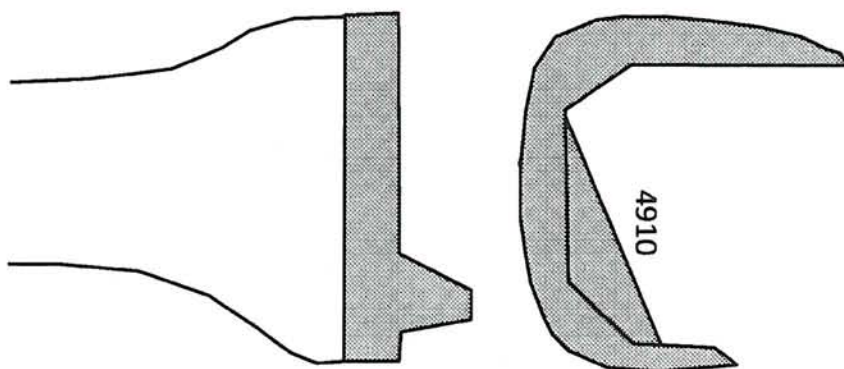


FIG. 76A

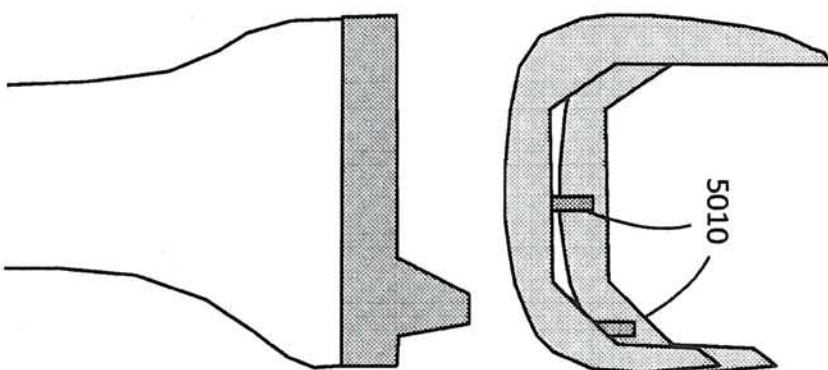


FIG. 76B

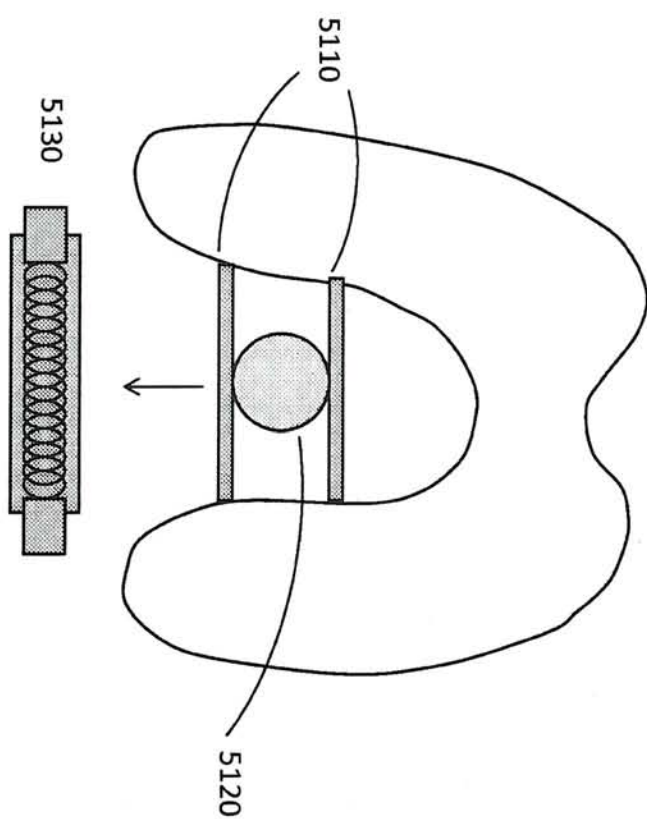
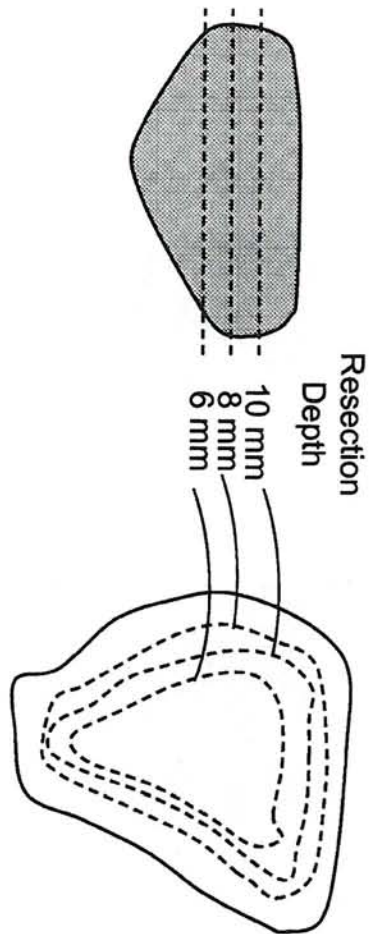


FIG. 77

Axial view



View of resected surface perimeters

Smoothed patellar implant perimeter

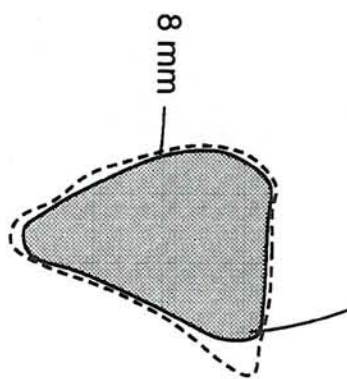


FIG. 78A

FIG. 78B

FIG. 78C

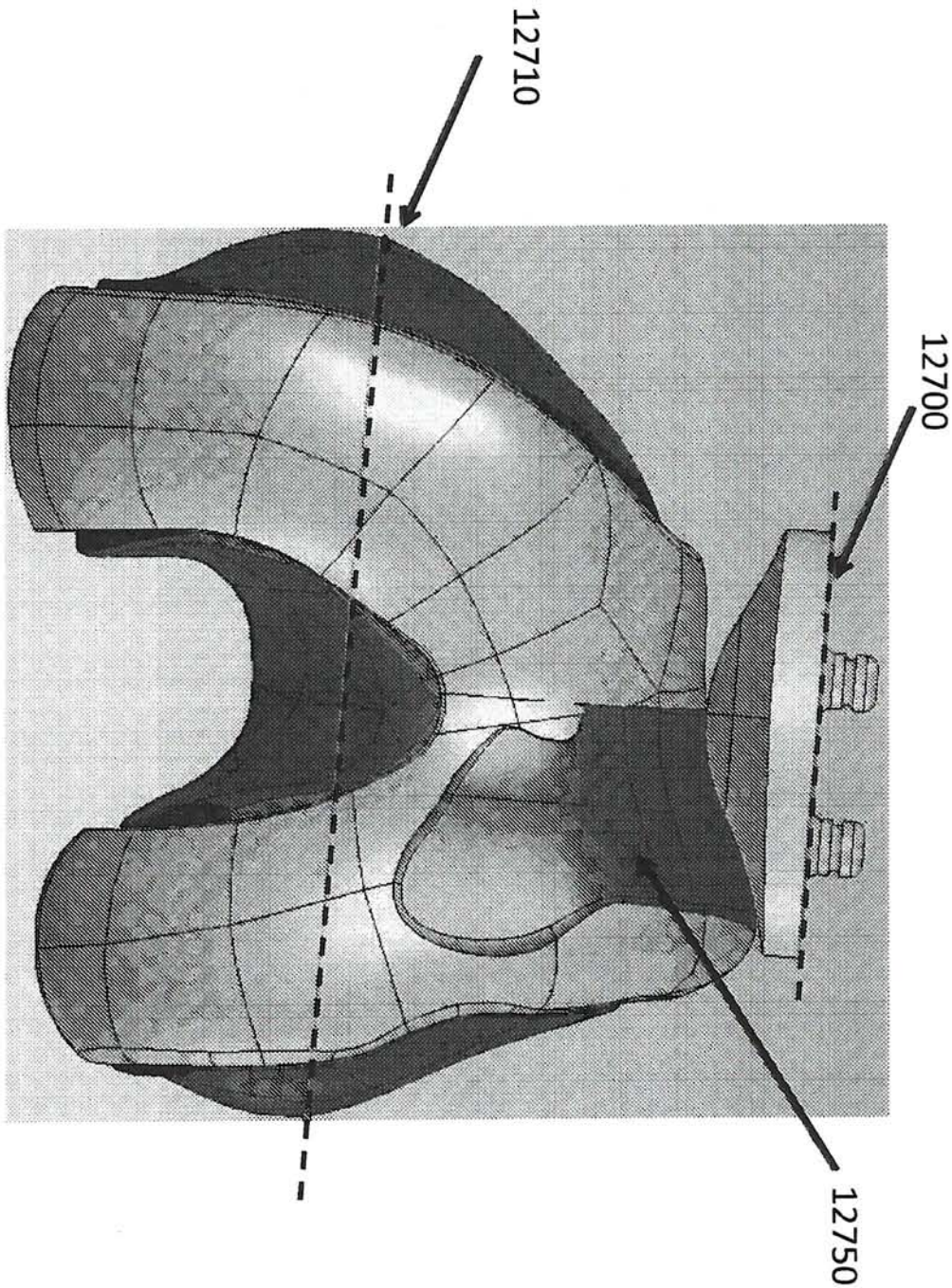


FIG. 79A

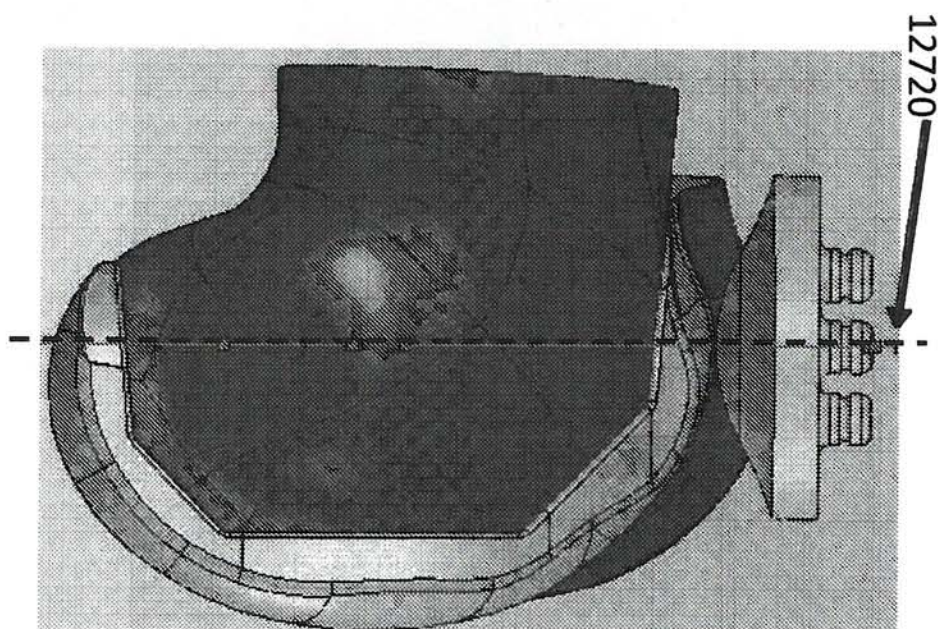


FIG. 79B

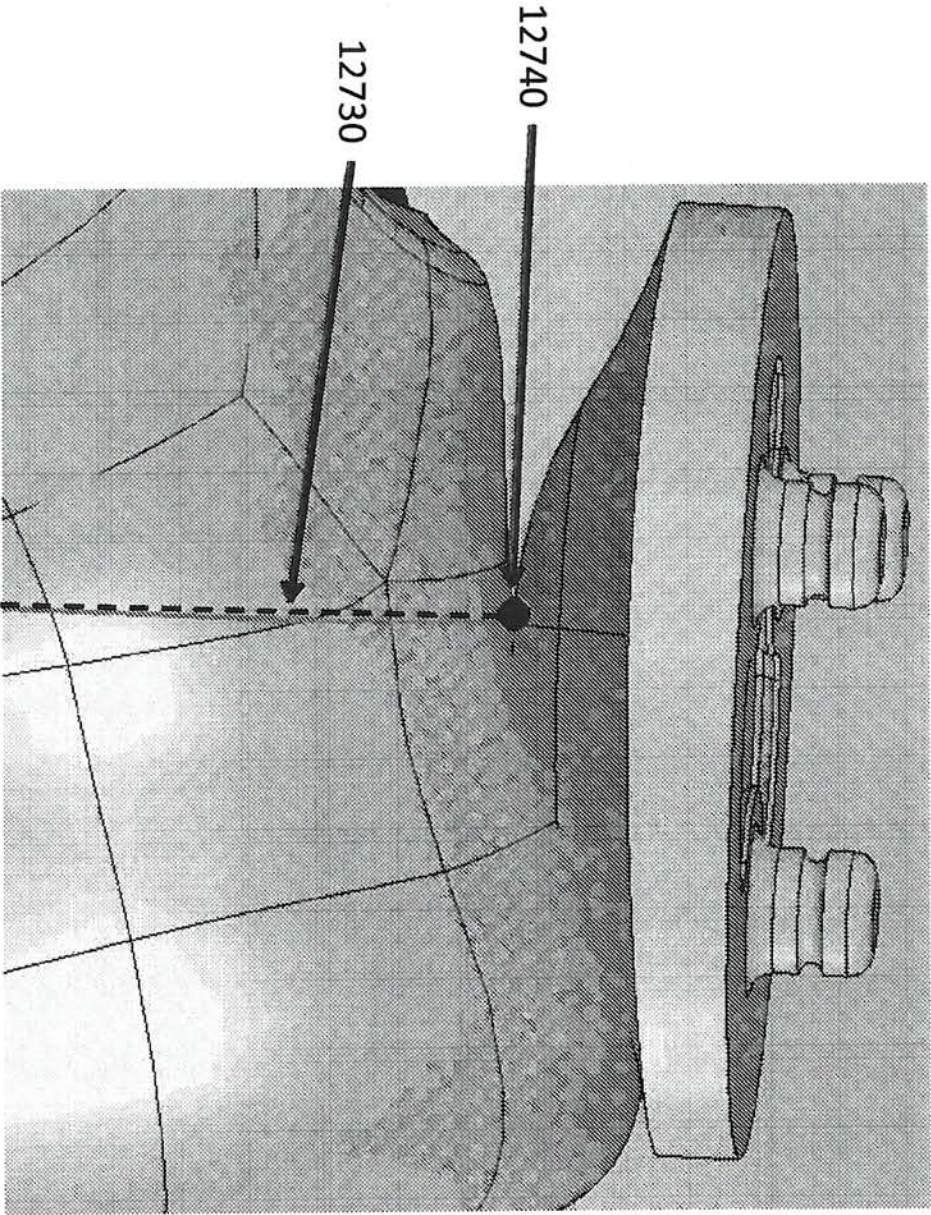


FIG. 79C

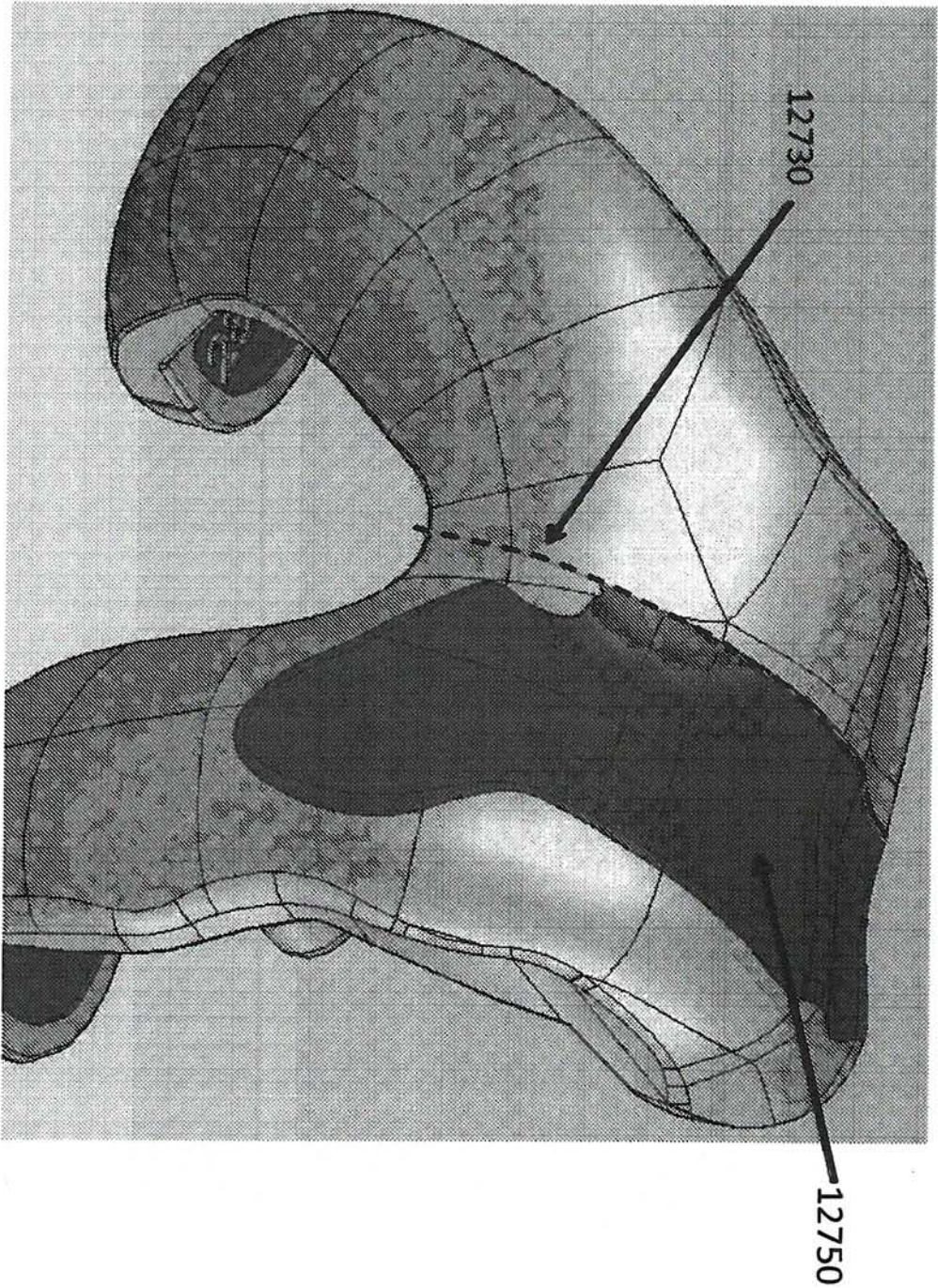
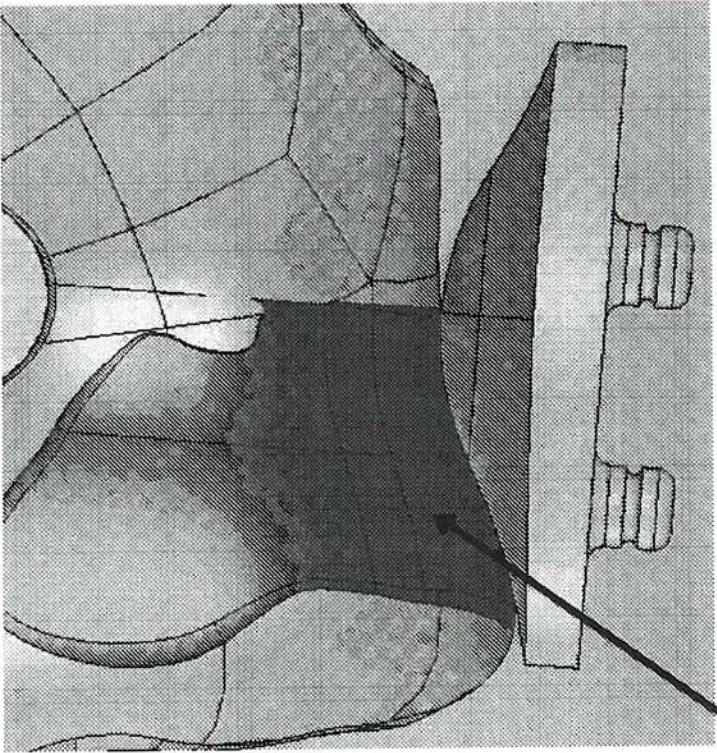
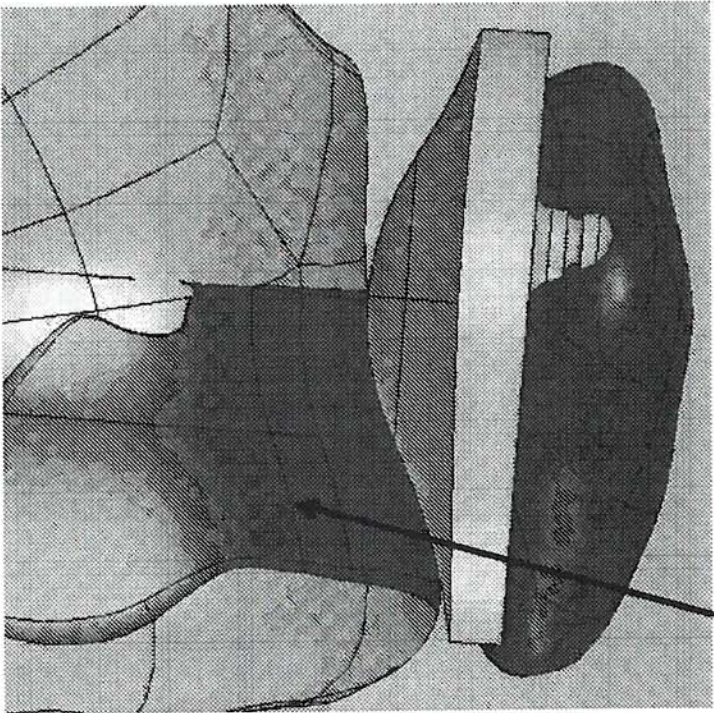


FIG. 79D



12750

FIG. 79E



12750

FIG. 79F

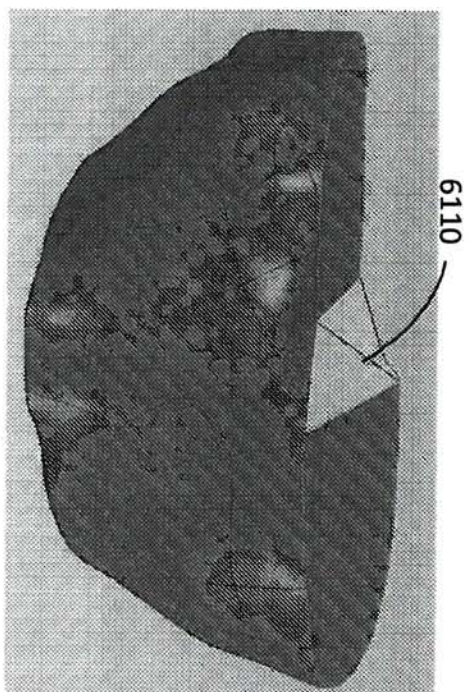


FIG. 80A

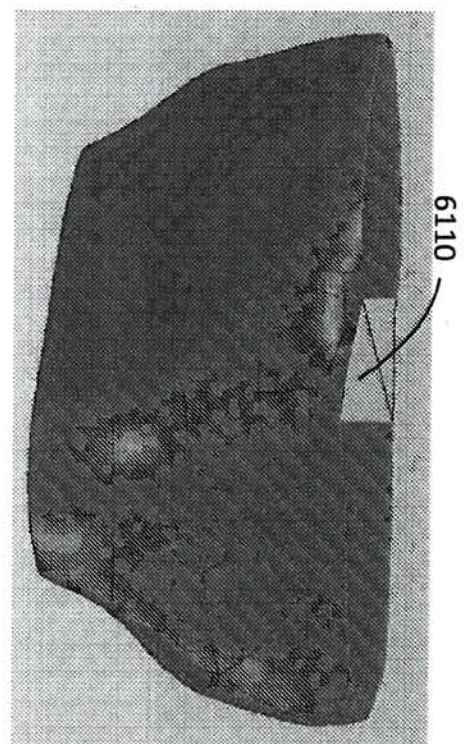


FIG. 80C

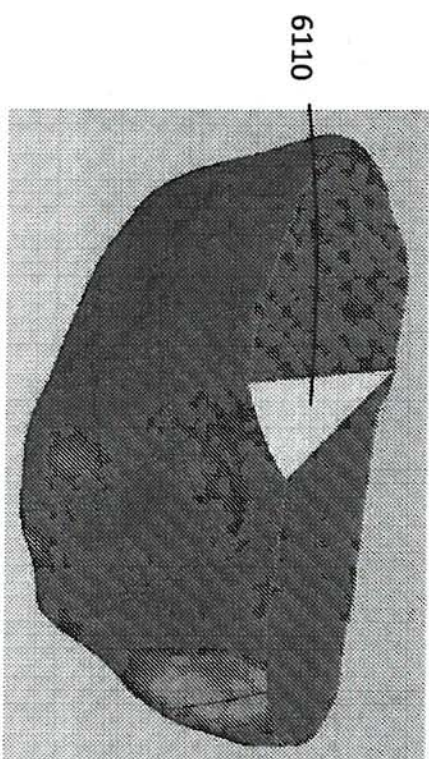
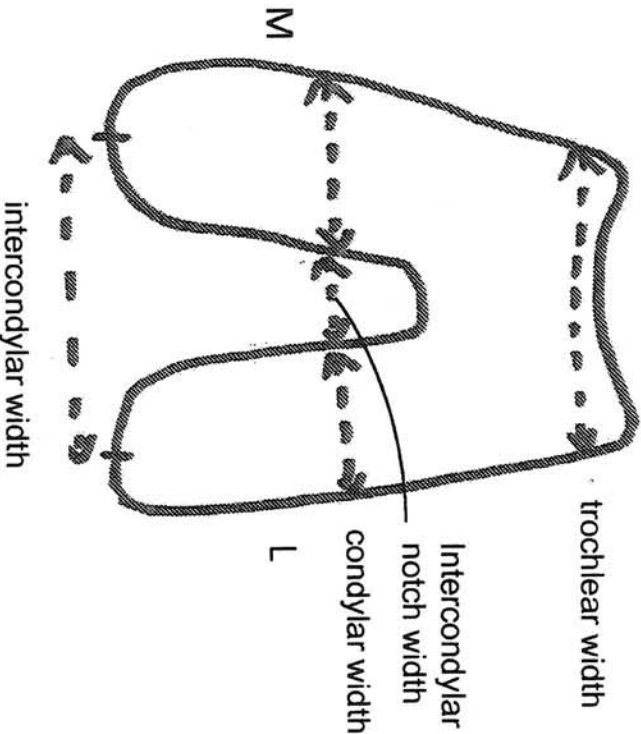
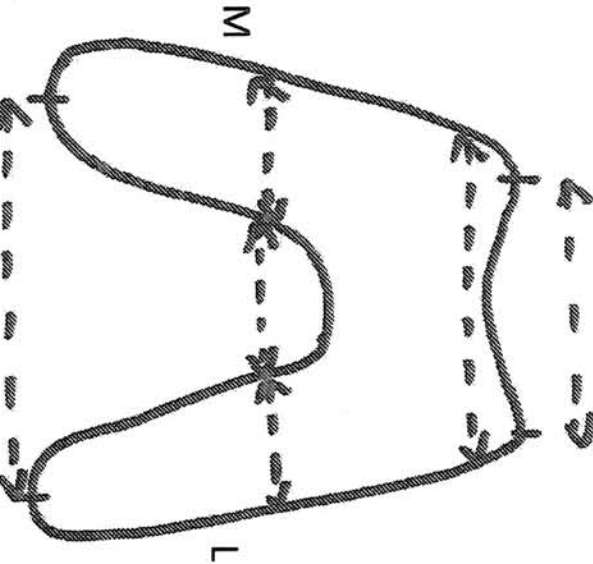


FIG. 80B



- Condyle width
- Medial different from lateral condyle

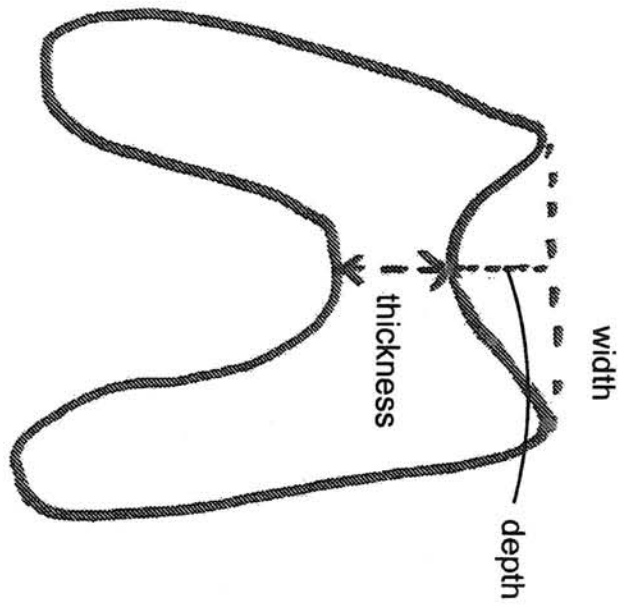
FIG. 81A



- Wide notch
- Narrow condyle
- Medial different from lateral condyle

FIG. 81B

- Small trochlea thickness
- Deep trochlea depth



- Wide trochlea thickness
- Shallow trochlea depth

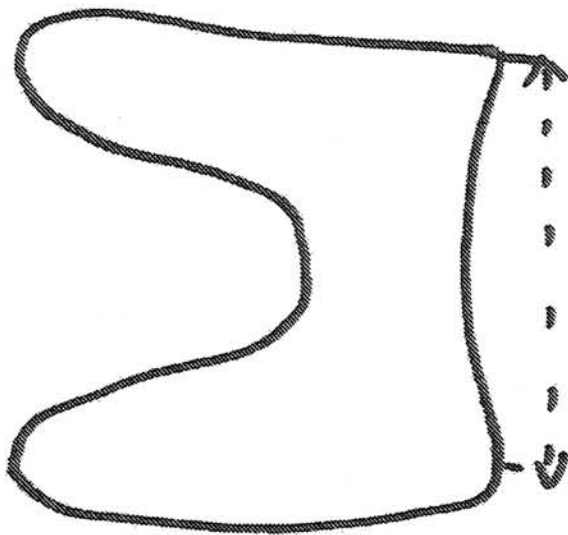
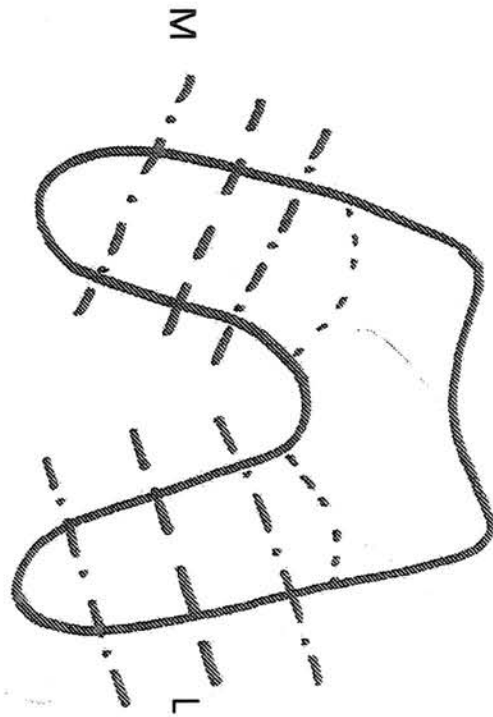


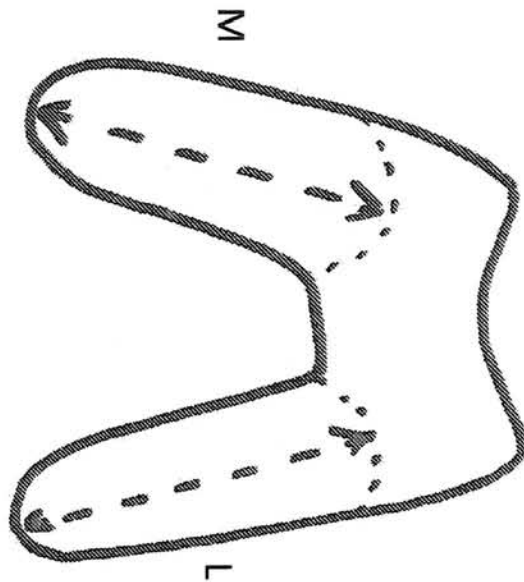
FIG. 81C

FIG. 81D



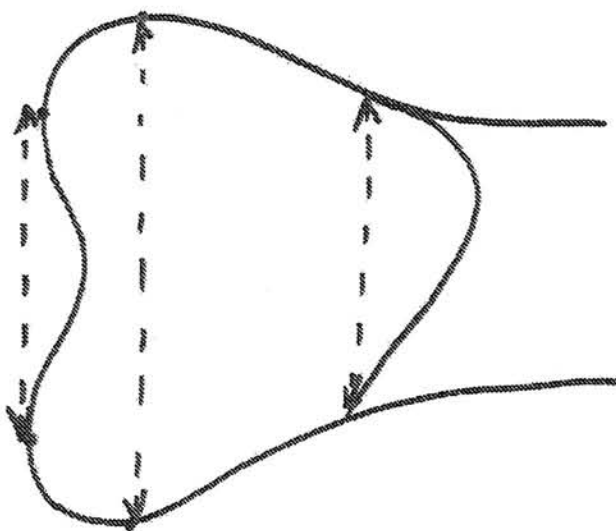
- Measure of condyle width
- Each condyle assessed independently
- One or more measures per condyle

FIG. 81E



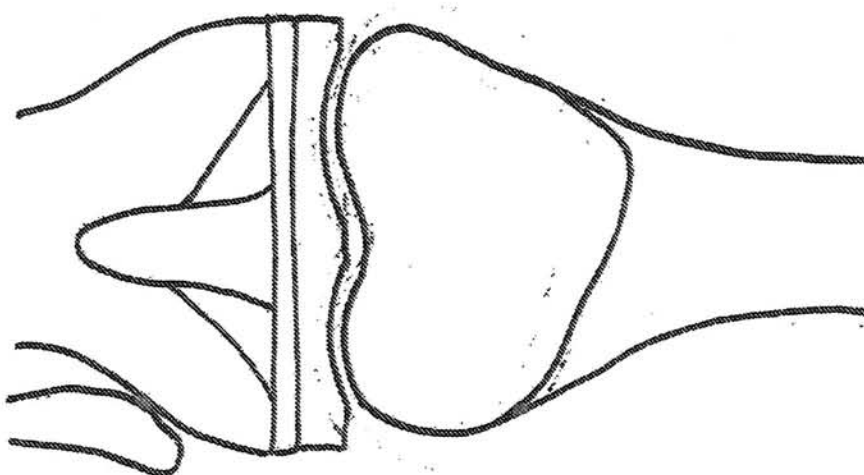
- Measure of condyle length
- Each condyle assessed independently
- One or more measures can apply per condyle

FIG. 81F



- Various M-L measures
- See and compare these and tibial trays in
FIGS. 63A-64F

FIG. 81G



- "Normal" femur / tibia width ratio

FIG. 81H

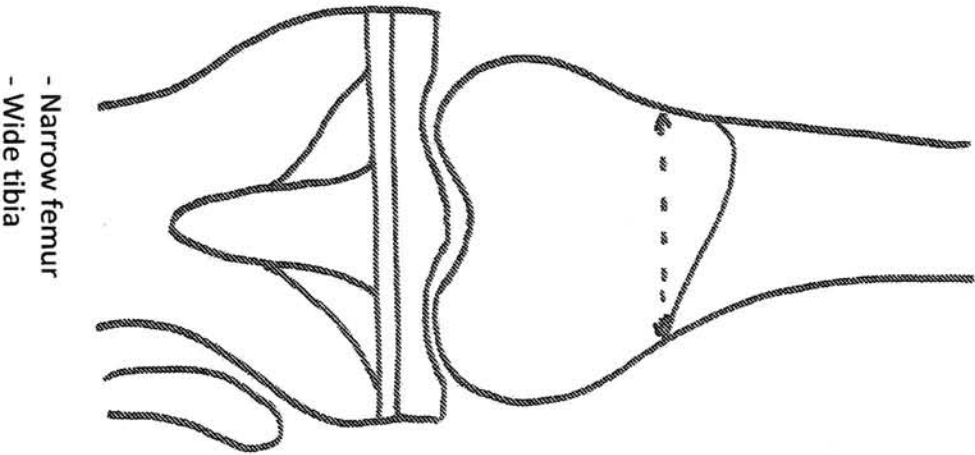


FIG. 81I

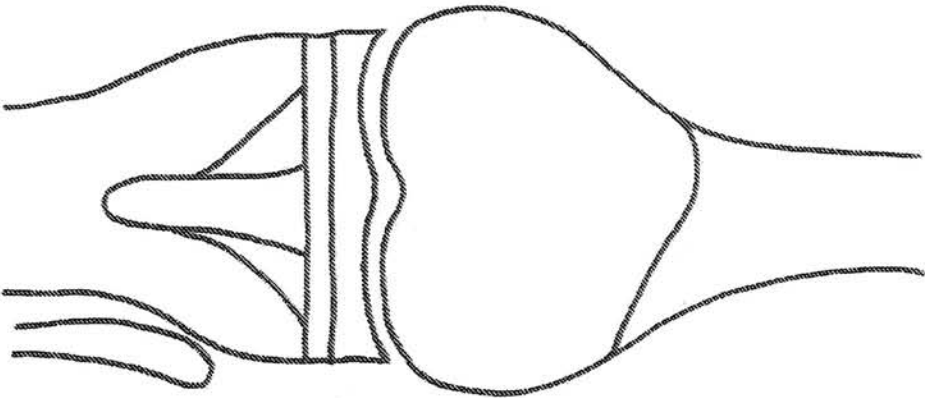


FIG. 81J

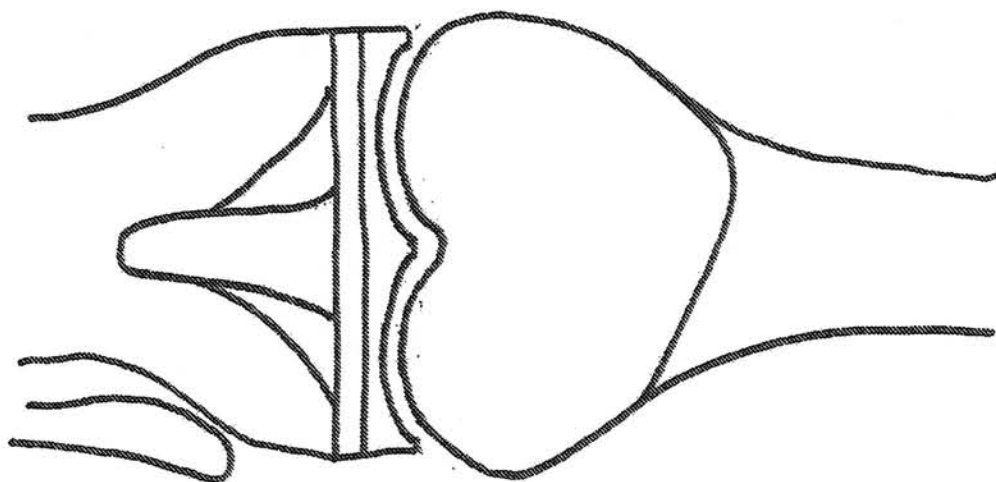


FIG. 81K

- Deep trochlea
- Note change in tibial insert aspects



2mm



3mm



4mm

FIG. 82

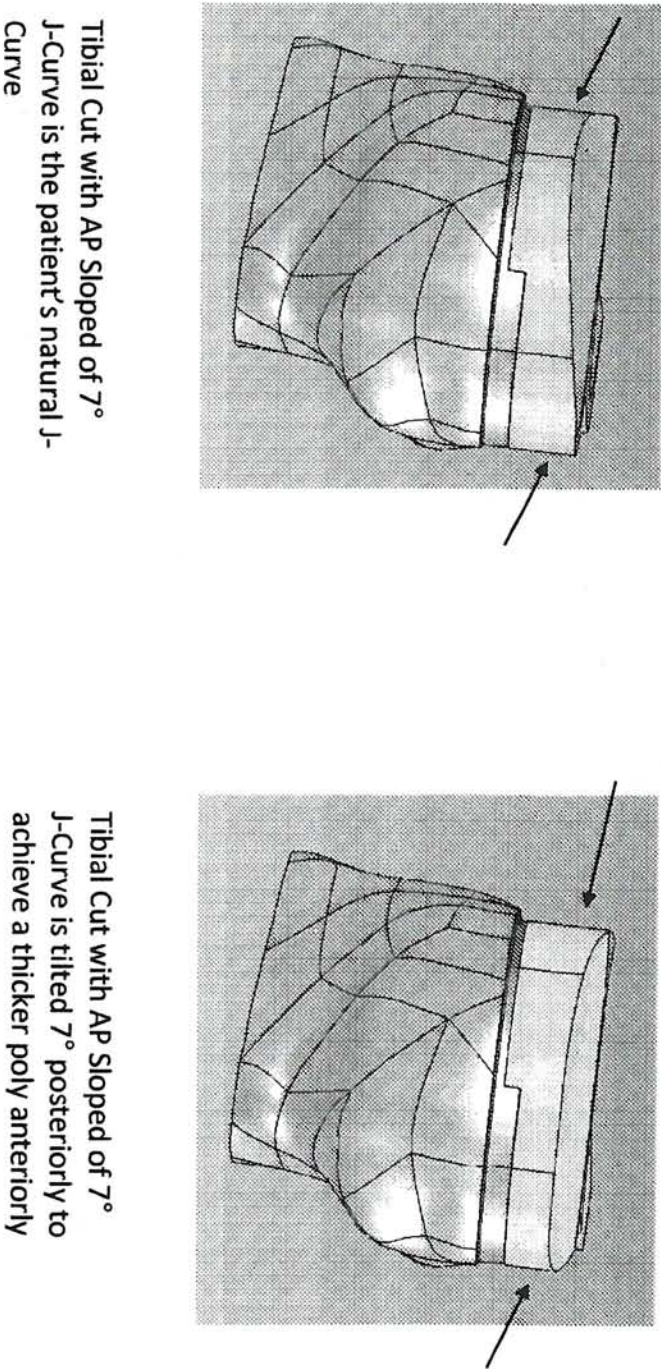


FIG. 83

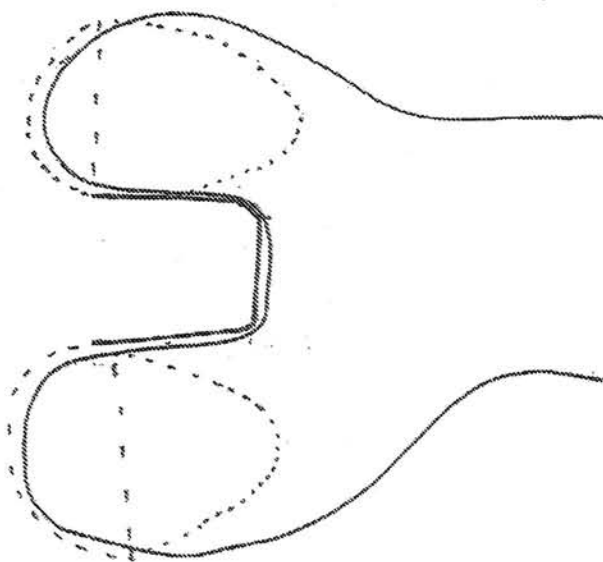


FIG. 84A

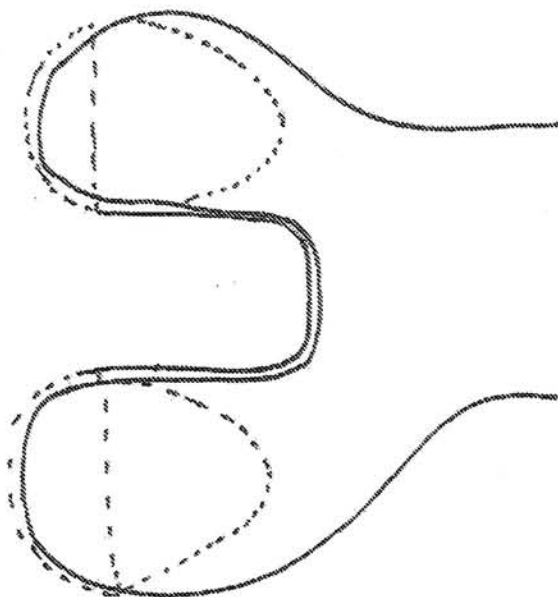


FIG. 84B

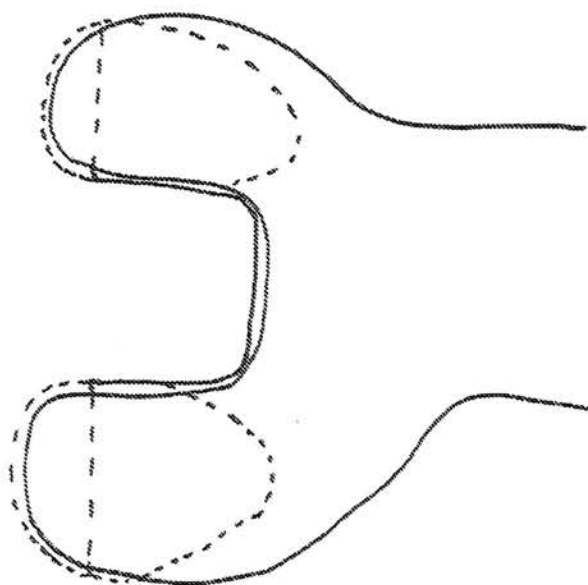


FIG. 84C

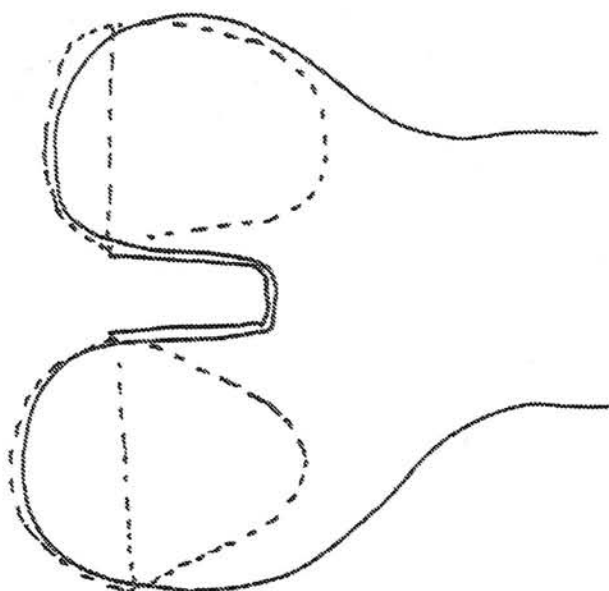


FIG. 84D

FIG. 84E

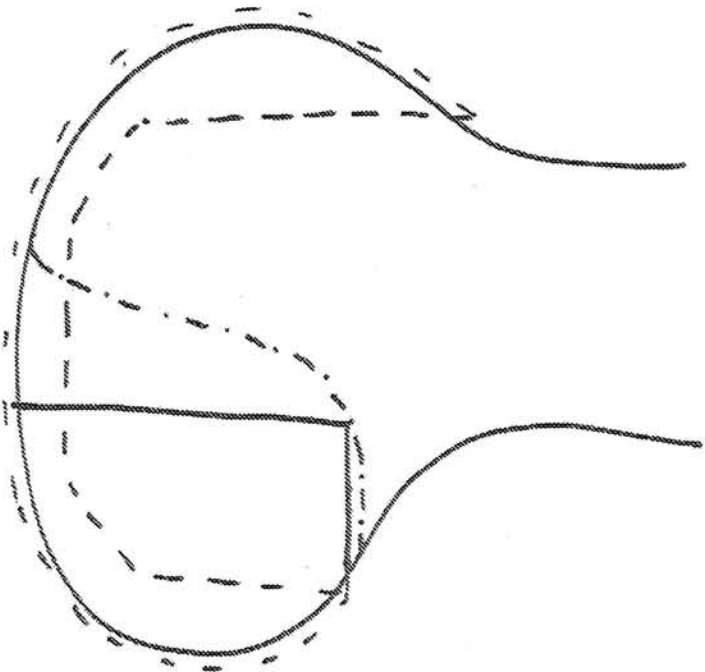
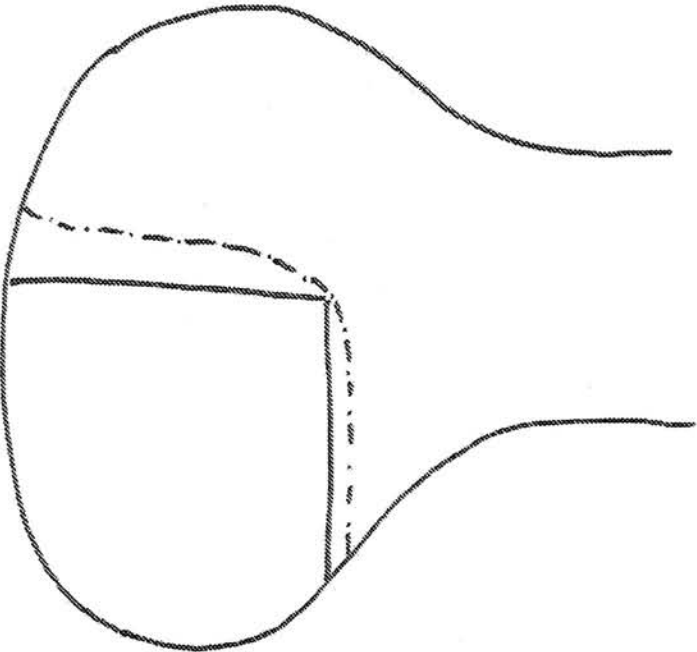


FIG. 84F



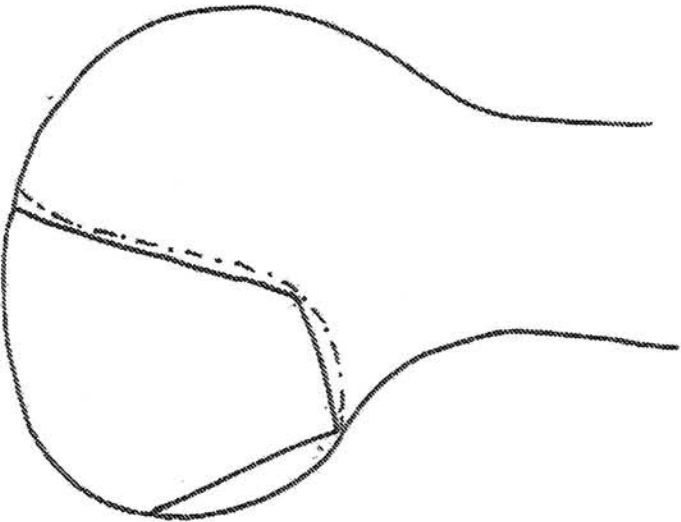


FIG. 84G

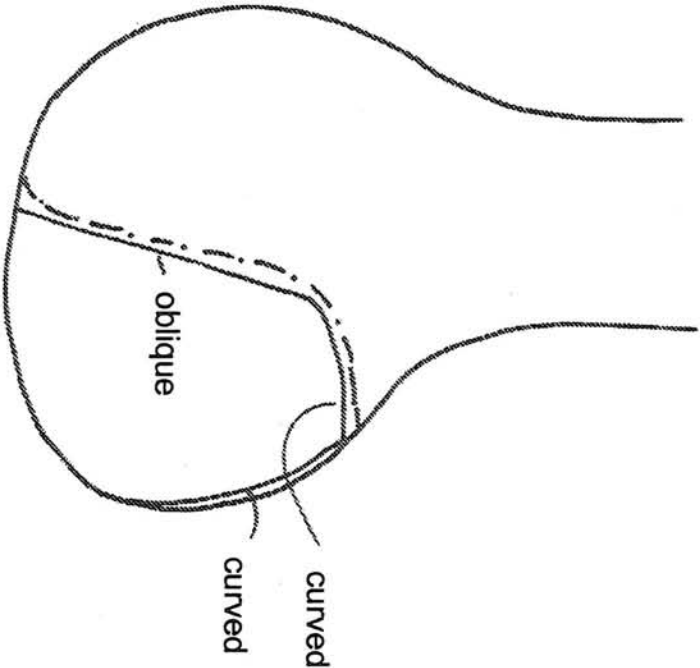


FIG. 84H

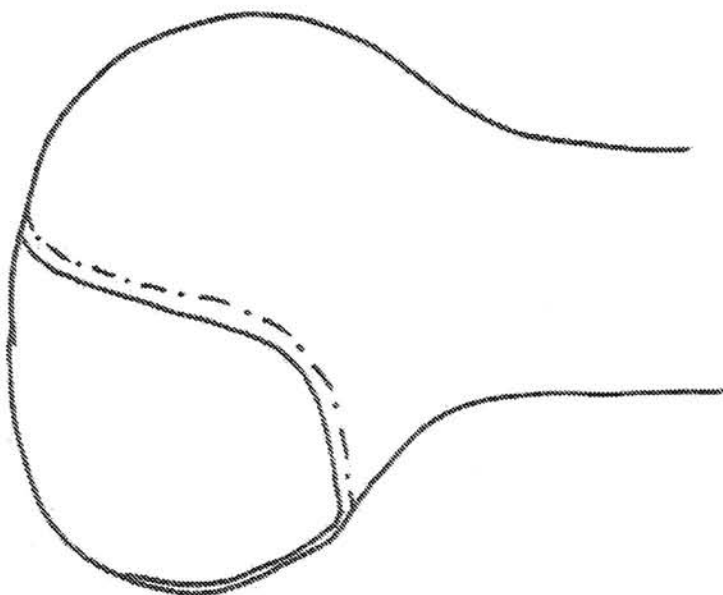


FIG. 84I

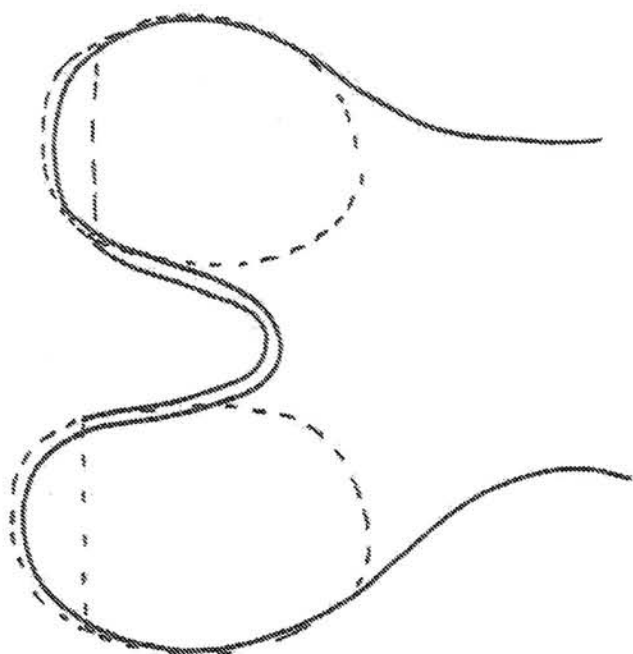


FIG. 84J

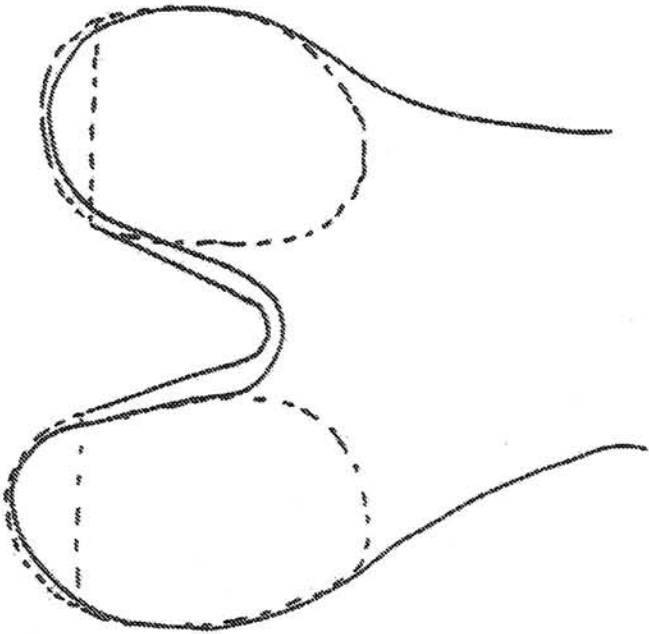


FIG. 84K



A-P view

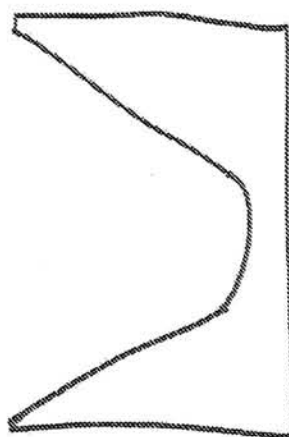


A-P view
symmetric

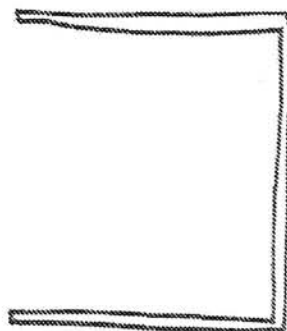


A-P view
asymmetric

FIG. 84L



A-P view



Lateral view

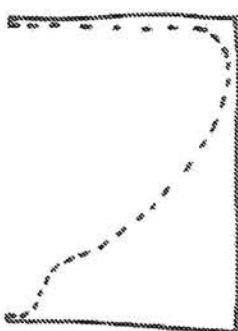
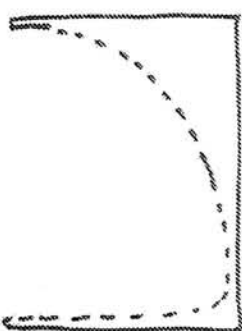
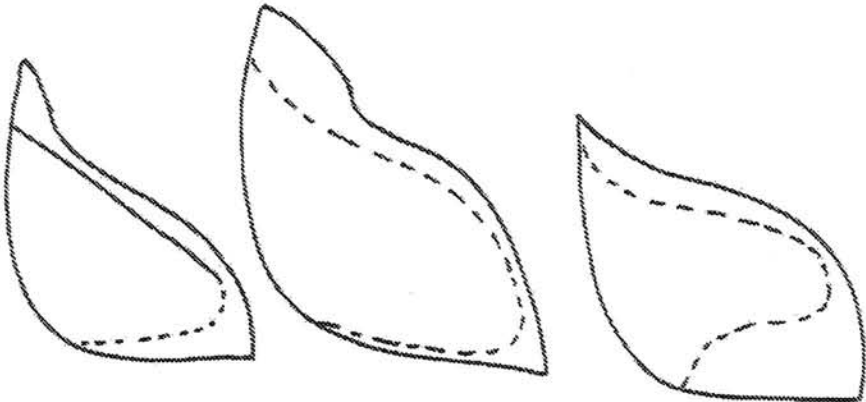


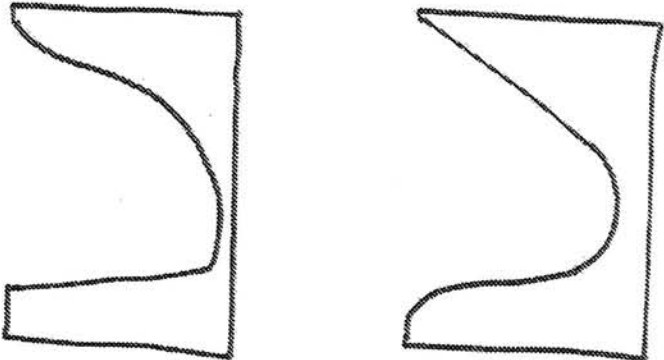
FIG. 84M

FIG. 84N



Lateral view

FIG. 840



Lateral view

FIG. 84P

FIG. 85A

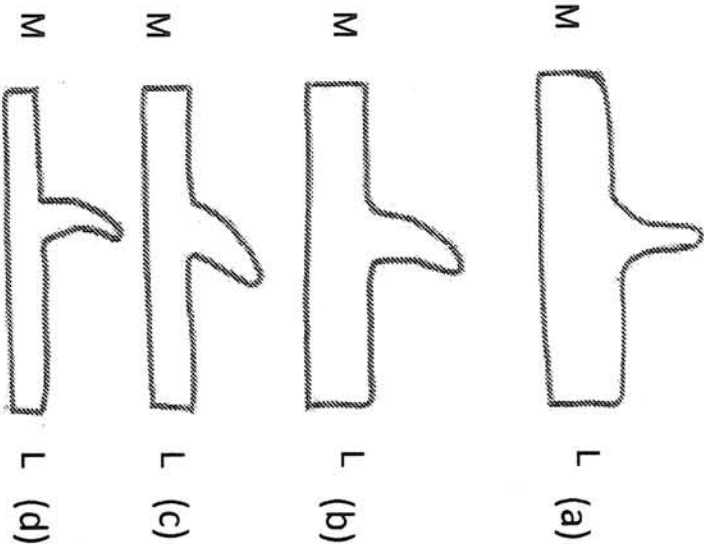


FIG. 85B

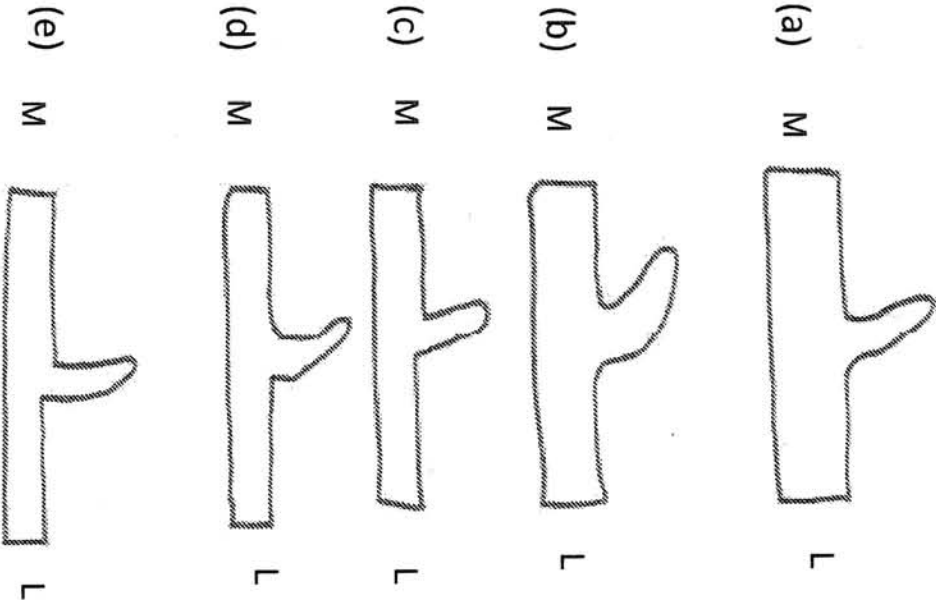


FIG. 86A

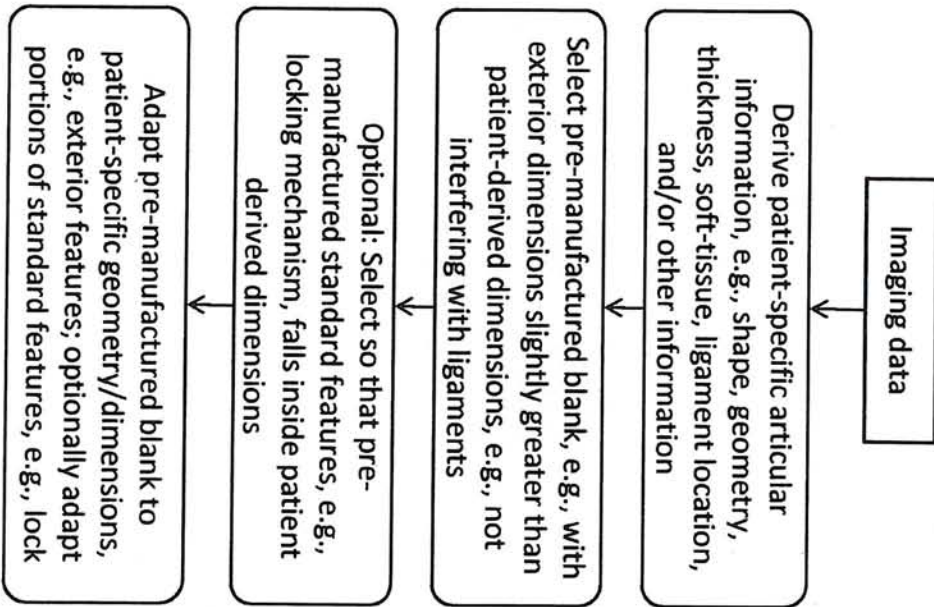
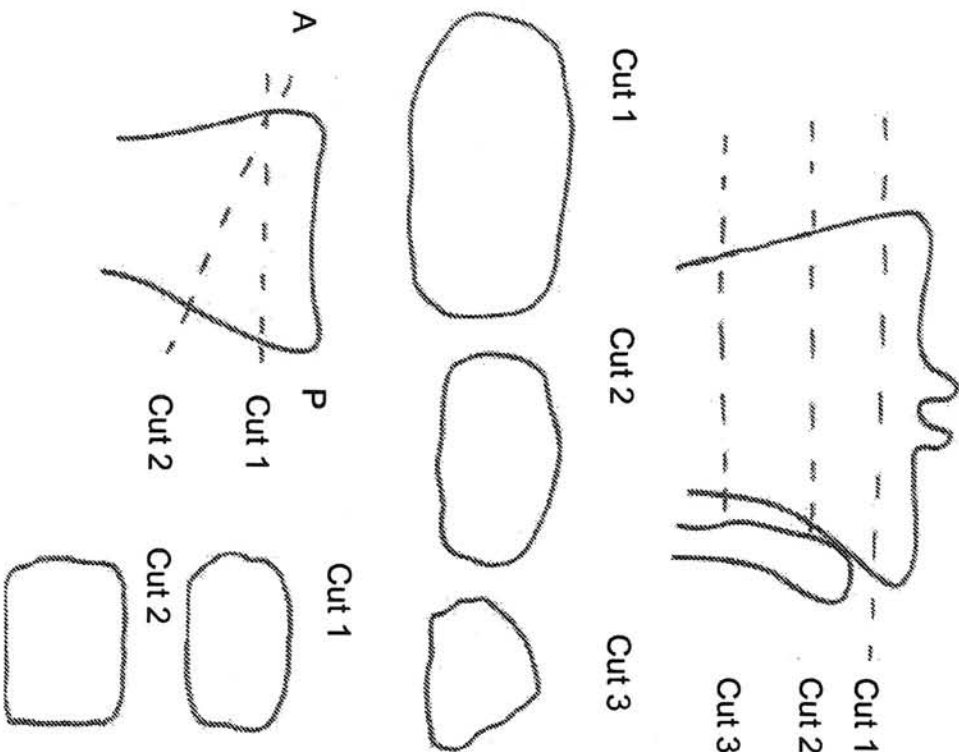


FIG. 86B



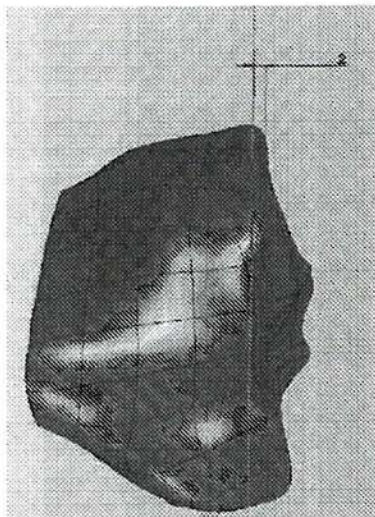


FIG. 87A

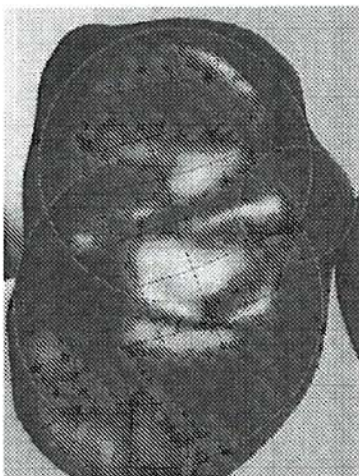


FIG. 87B

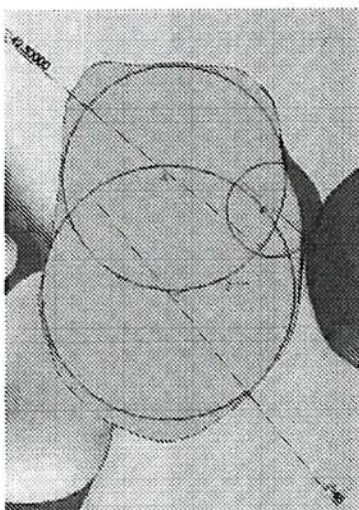


FIG. 87C

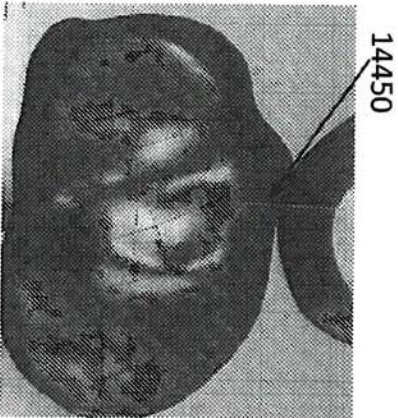


FIG. 88A

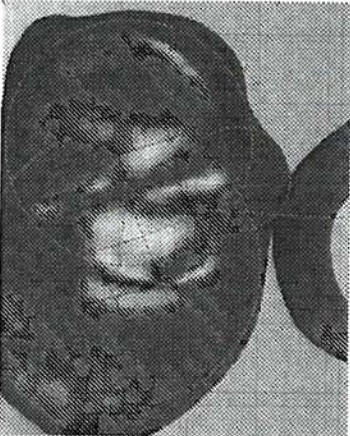


FIG. 88B

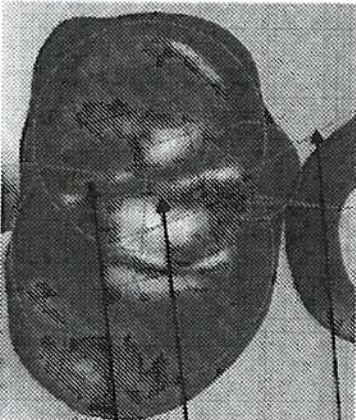


FIG. 88C

14440
14430
14420

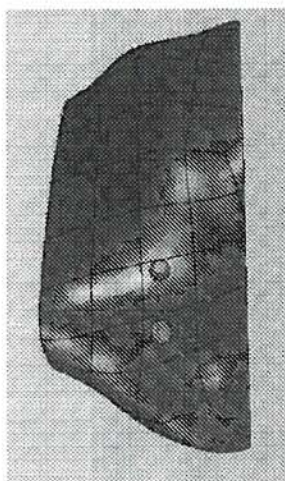


FIG. 89A

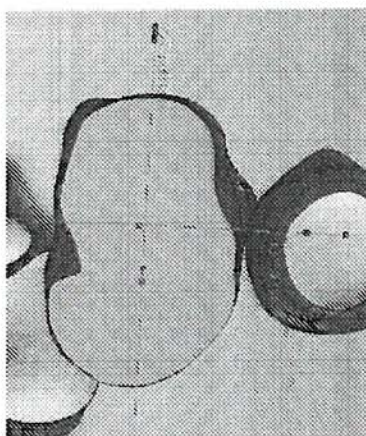


FIG. 89B

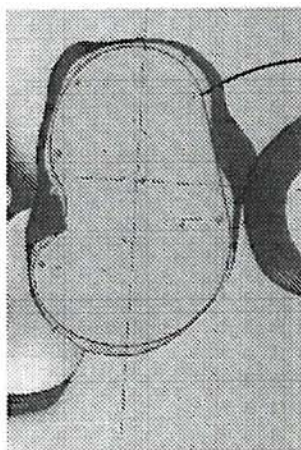


FIG. 89C

14500

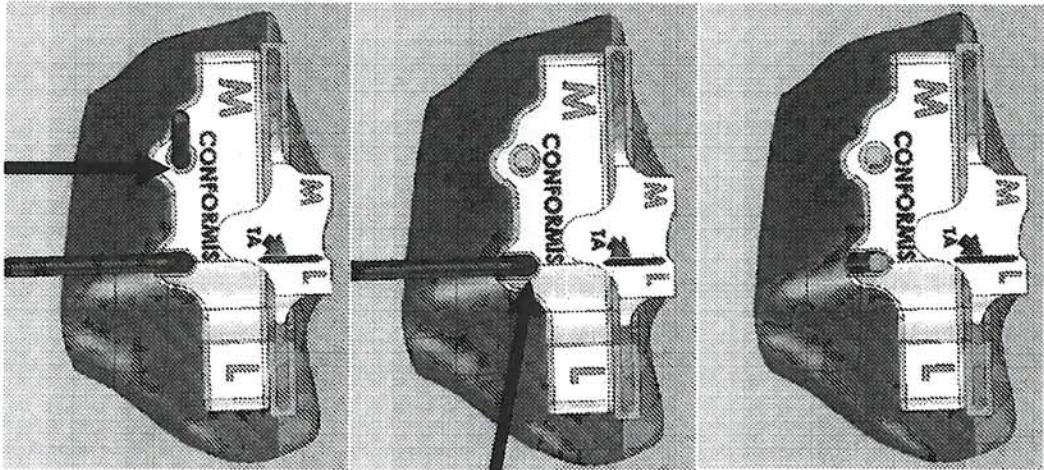


FIG. 92

FIG. 91A

FIG. 90A

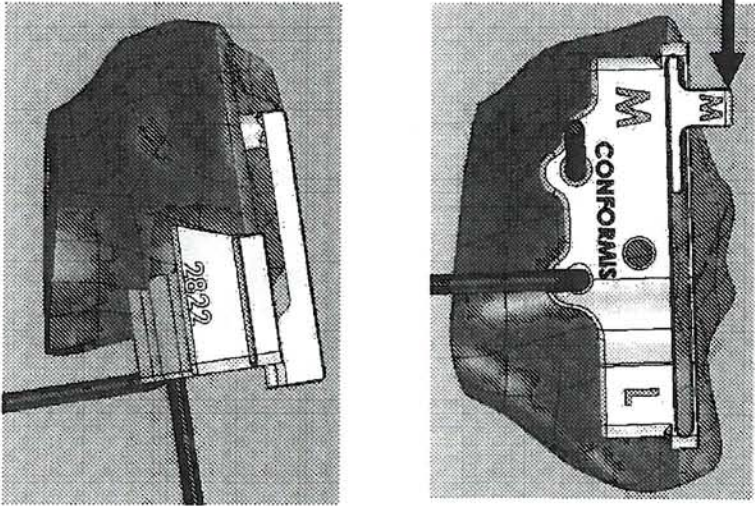


FIG. 90B

FIG. 91A

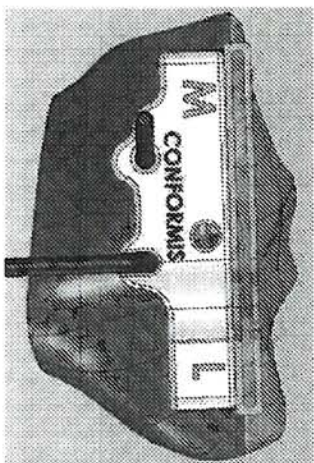


FIG. 93

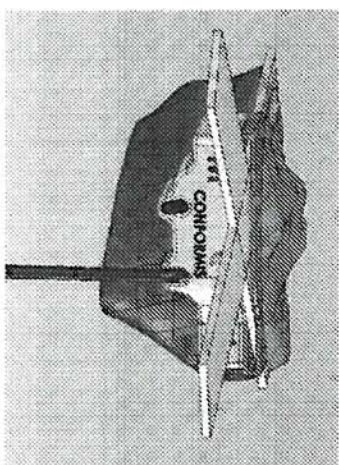


FIG. 94

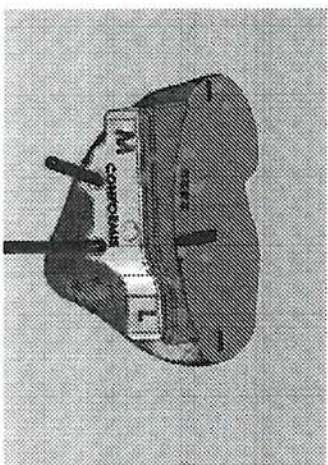


FIG. 95

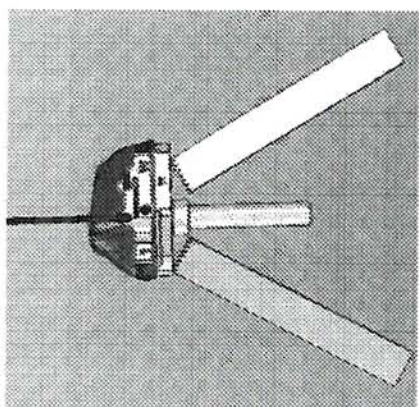


FIG. 98

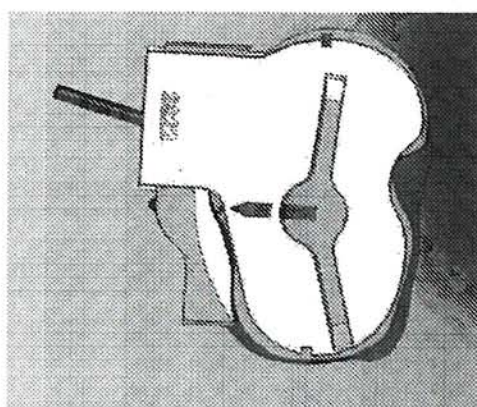


FIG. 96

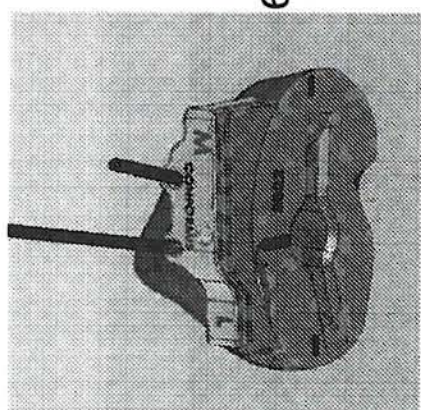


FIG. 99

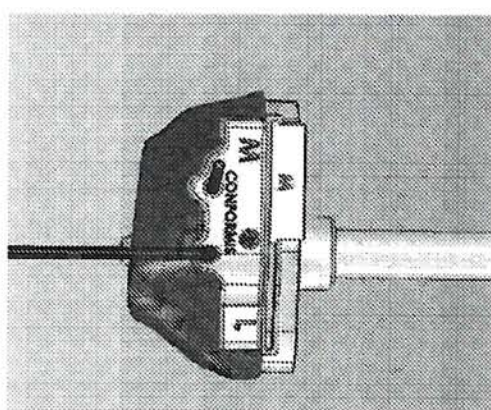


FIG. 97

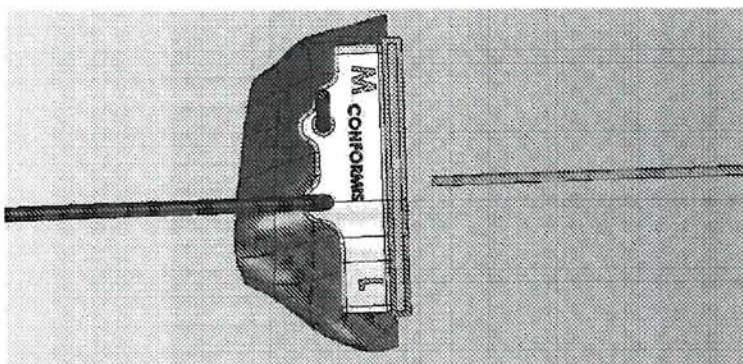


FIG. 100A

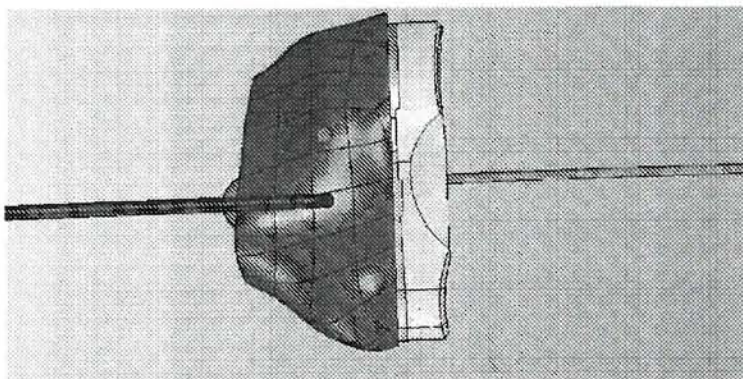


FIG. 100B

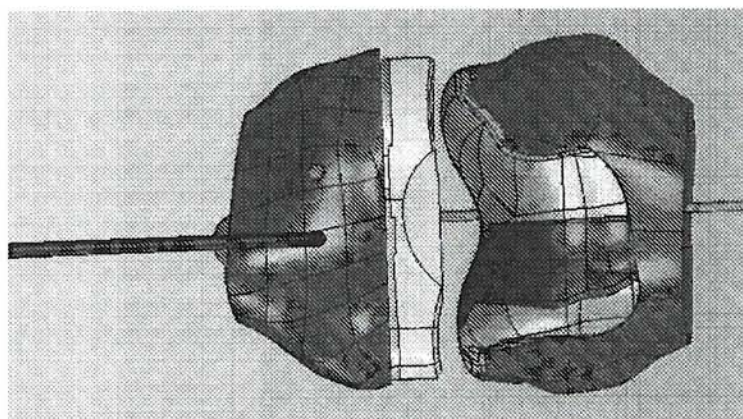


FIG. 100C

Tibial Rotation

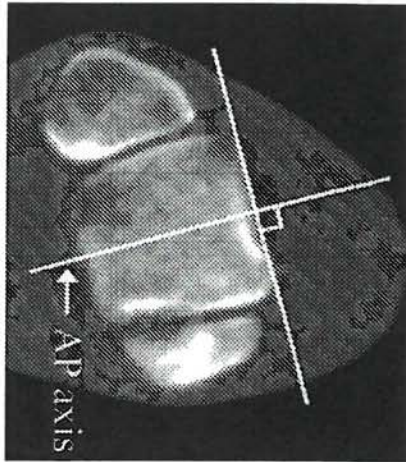


FIG. 101A

"Floating Insert" Technique

ROM technique, in which the knee is put through a full range of flexion and extension, allowing the tibial trial to orientate itself in the best position relative to the femoral component. The orientation is marked on the anterior tibial cortex and the tibial component is implanted to match this mark.

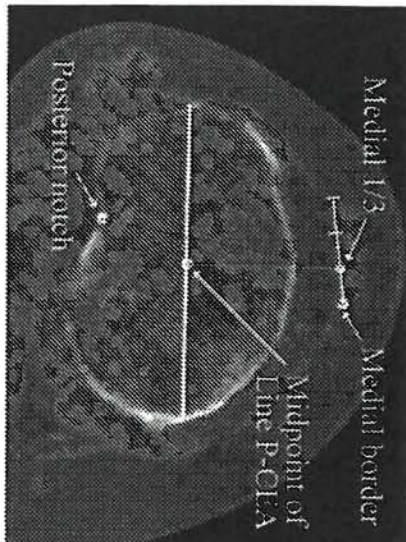


FIG. 101B

Anatomic Landmark Technique

(Mizu-uchiet al, Effect of Ankle Rotation on Cutting of the Tibia in TKA, JBJS 2006; Vol 88; Pages 2632-2636)

- AP Axis of ankle joint
- The line perpendicular to the anterior cortical line

Tibial Rotation Continues

TABLE I Data on Posttreatment Angle (°)

Tibial Anteroposterior Axis	Angle (°)		
	All Patients (N = 53)	Male Patients (N = 11)	Female Patients (N = 42)
1	10.0 ± 7.4 (1.0 to 32.0)	10.0 ± 7.3 (0.1 to 26.0)	10.7 ± 7.5 (1.0 to 32.0)
2	9.0 ± 7.6 (-10.0 to 26.0)	7.4 ± 7.0 (-4.5 to 19.0)	9.2 ± 7.6 (-10.0 to 24.0)
3	9.0 ± 8.4 (0.0 to 18.0)	8.3 ± 7.3 (-8.0 to 14.0)	8.7 ± 8.7 (-18.0 to 18.0)
4	10.7 ± 8.4 (7.0 to 23.0)	20.0 ± 5.0 (12.0 to 30.0)	10.0 ± 8.0 (7.0 to 33.0)
5	5.0 ± 8.8 (-7.0 to 20.0)	5.0 ± 5.2 (-2.0 to 10.0)	6.0 ± 8.0 (-7.0 to 20.0)

*The values are given as the mean and the standard deviation, with the range in parentheses. † Possible values of the angle: 100.0 to 180.0 for rotation of the anteroposterior axis of the distal end of the tibia.

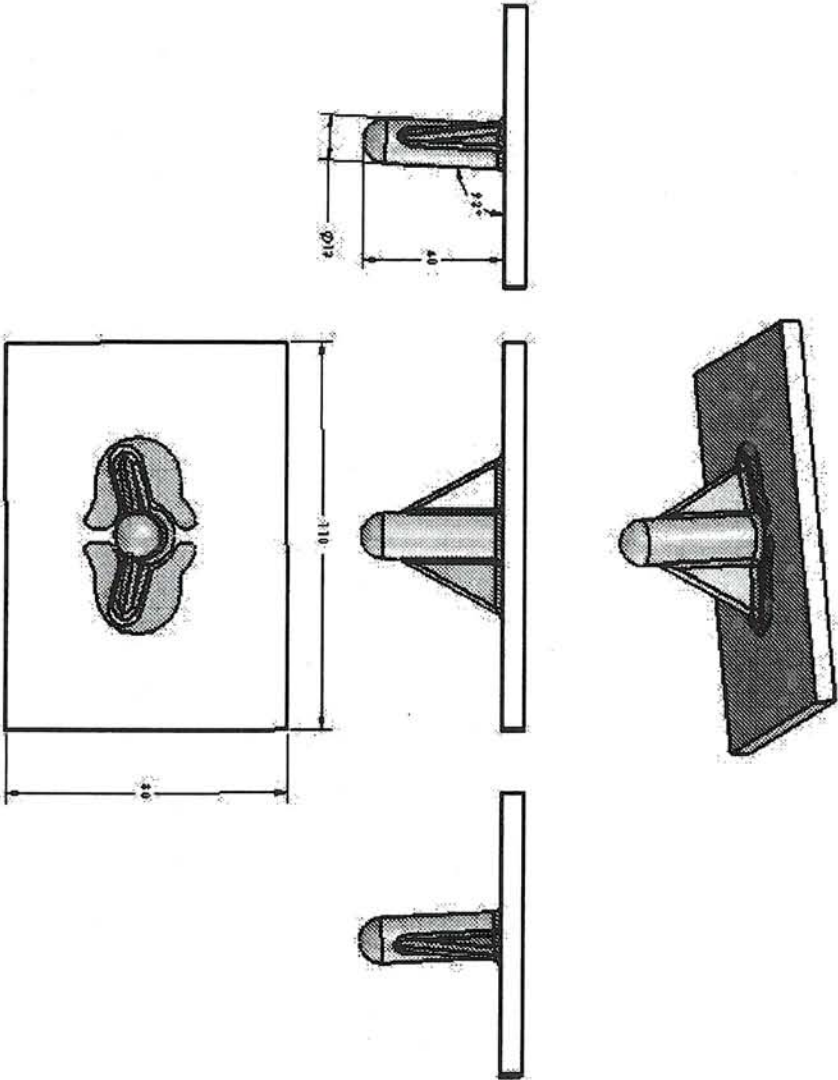
TABLE II Predicted Postoperative Tibial Rotational Alignment

Tibial Anteroposterior Axis	Angle (°) for All Patients (N = 53)	
	7° Slope	0° Slope
1	4.3 ± 1.9 (0.0 to 8.0)	2.3 ± 1.0 (0.1 to 4.0)
2	2.4 ± 2.0 (-2.0 to 6.0)	1.4 ± 1.2 (-1.4 to 3.5)
3	1.0 ± 1.8 (-4.4 to 4.0)	0.5 ± 1.0 (-2.2 to 2.4)
4	0.2 ± 1.6 (-1.7 to 4.0)	2.0 ± 0.9 (0.0 to 4.0)
5	3.0 ± 1.7 (-1.7 to 6.0)	0.0 ± 0.9 (-0.9 to 2.0)

*The values are given as the mean and the standard deviation, with the range in parentheses. † Possible values of the angle: 100.0 to 180.0.

(Mizutani et al, Effect of Ankle Rotation on Cutting of the Tibia in TKA, JBU S 2006; Vol 88; P ages 2632-2636)

FIG. 101C



Tibial Implant Profile

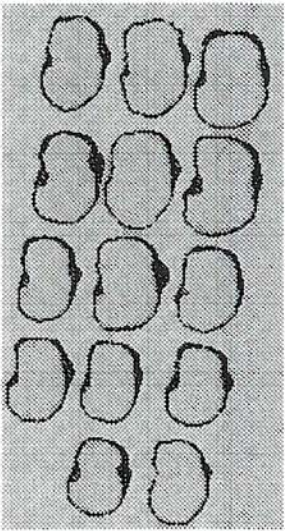


FIG. 103A

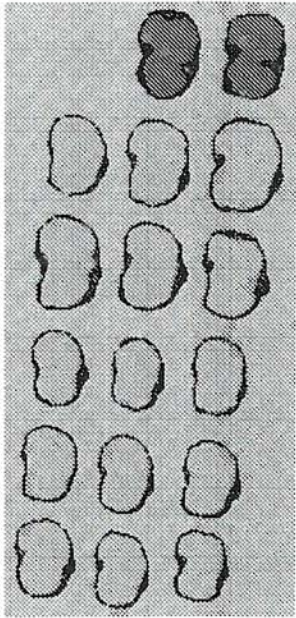


FIG. 104A

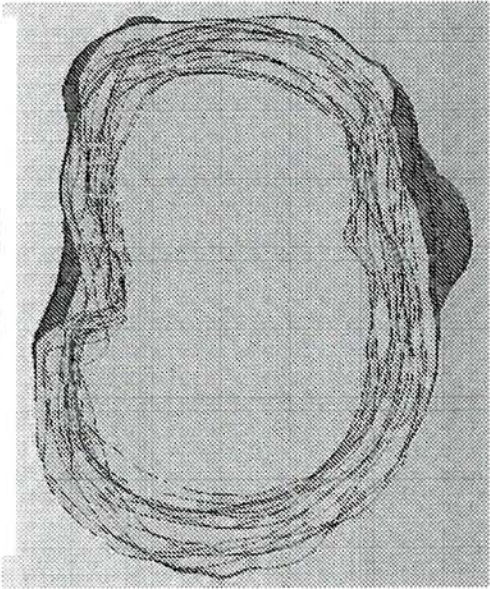


FIG. 103B

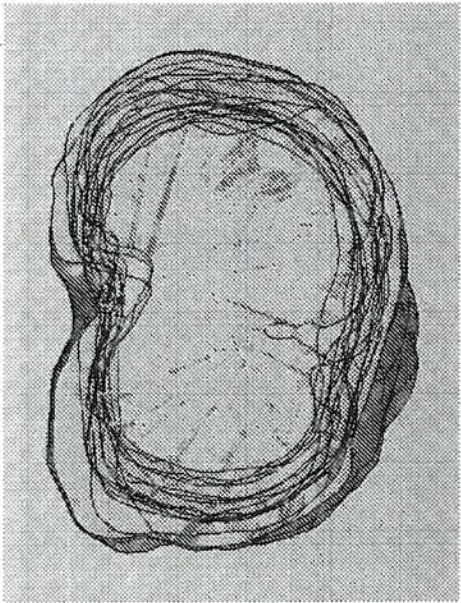


FIG. 104B

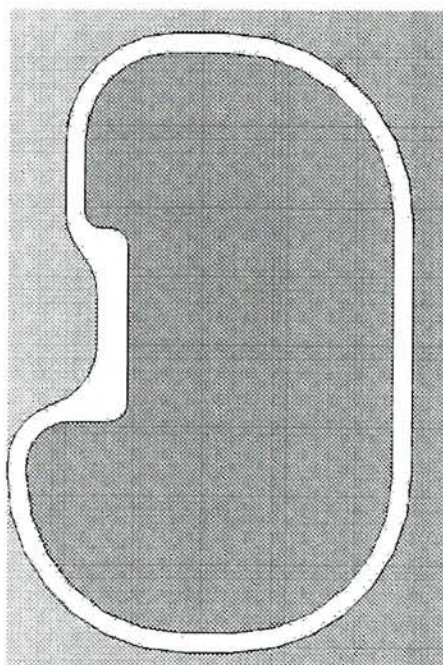


FIG. 105A

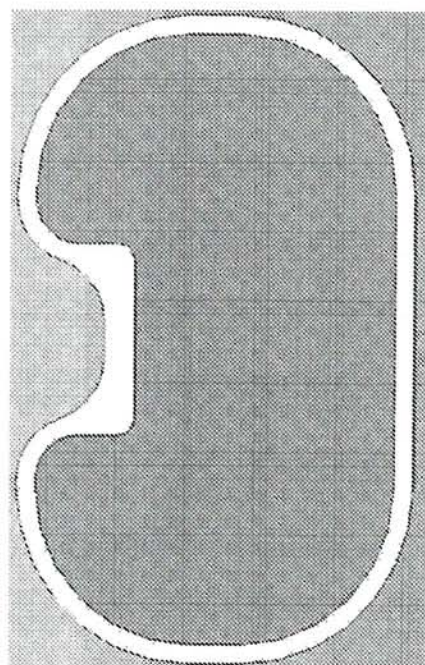


FIG. 105B

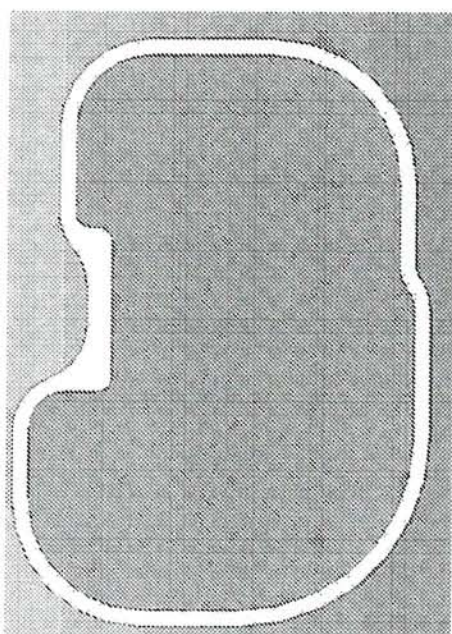


FIG. 105C

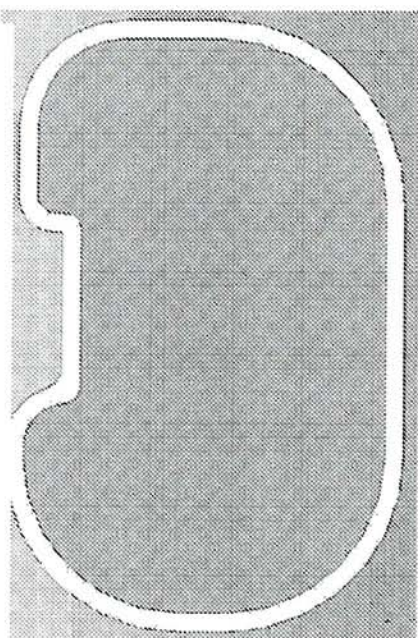


FIG. 105D

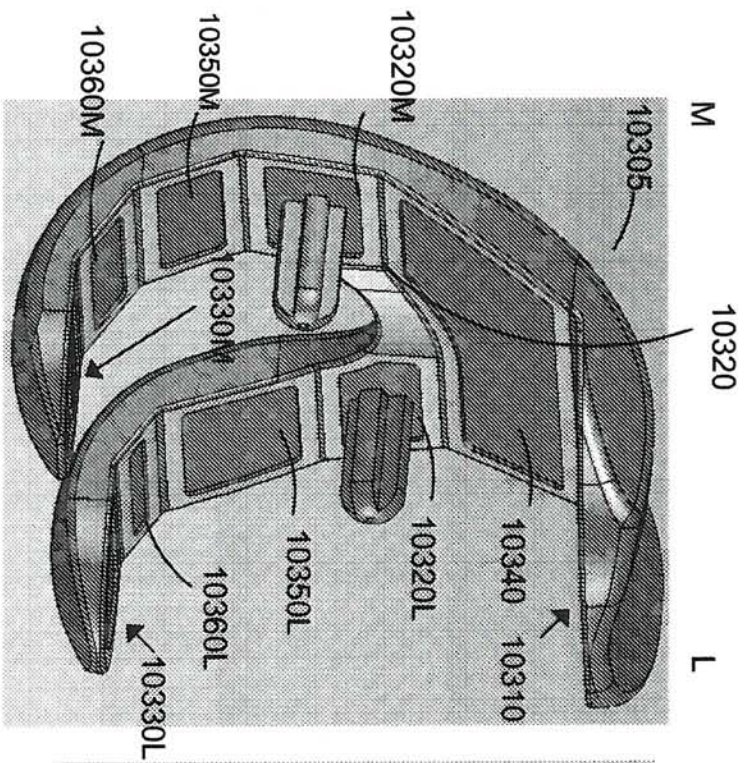


FIG. 106A

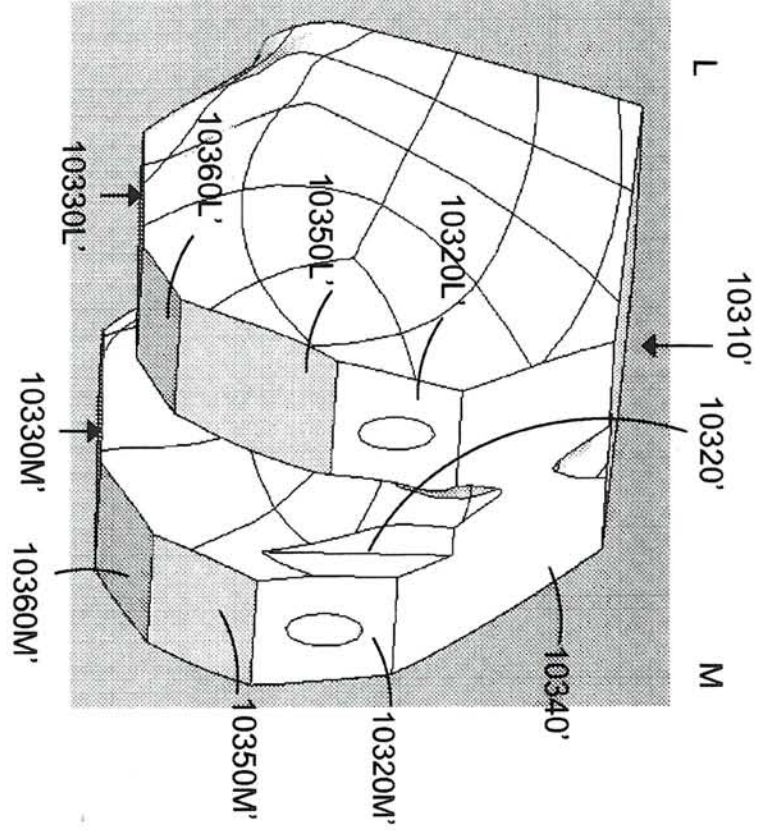


FIG. 106B

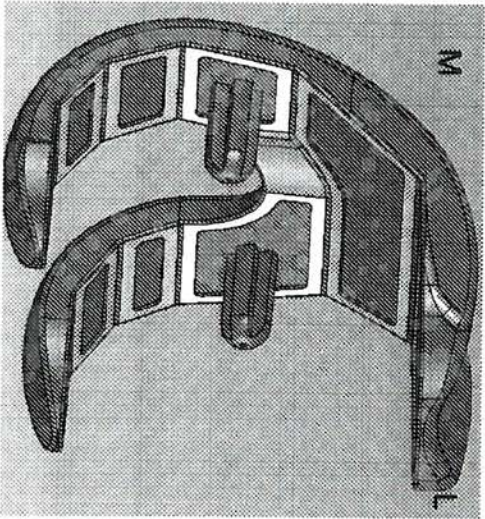


FIG. 106C

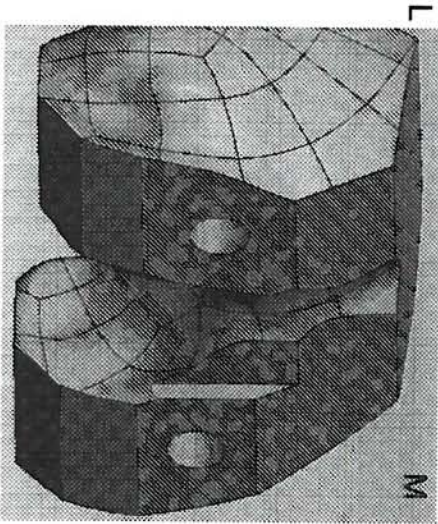


FIG. 106D

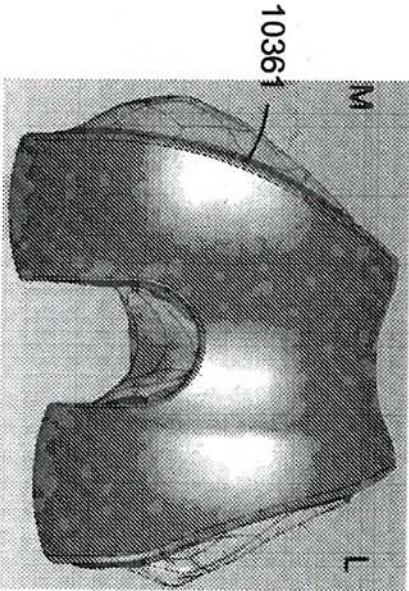


FIG. 106E

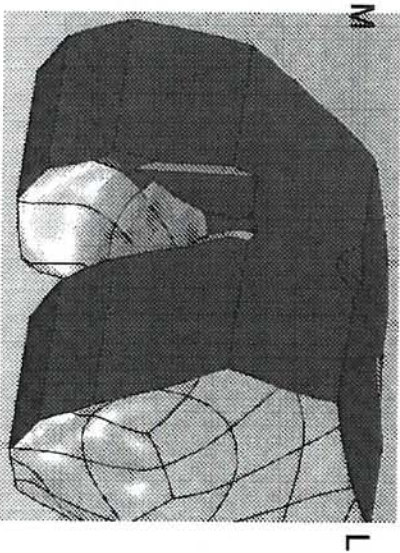


FIG. 106F

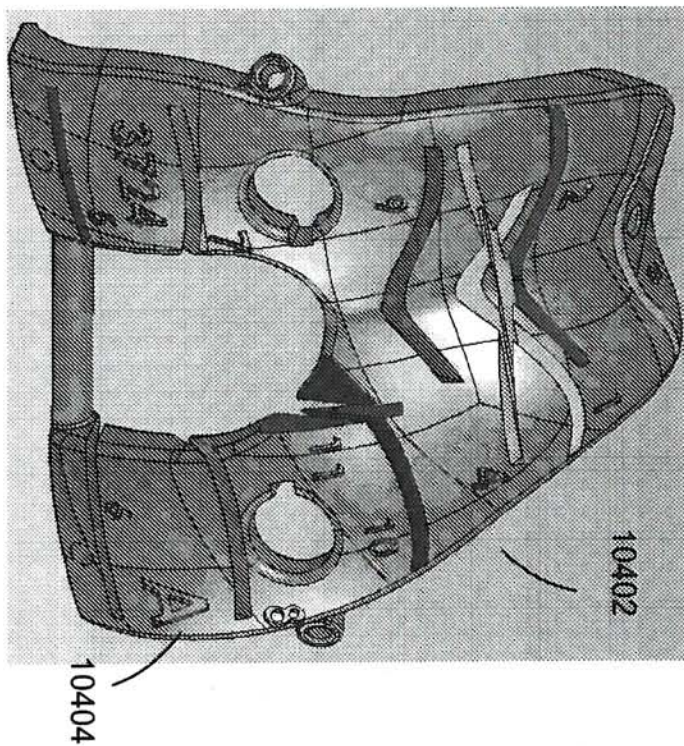


FIG. 107A

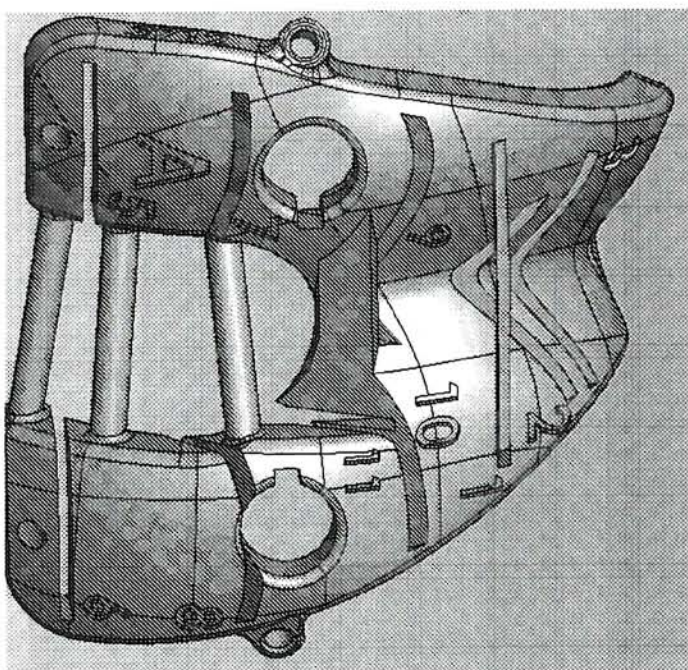


FIG. 107B

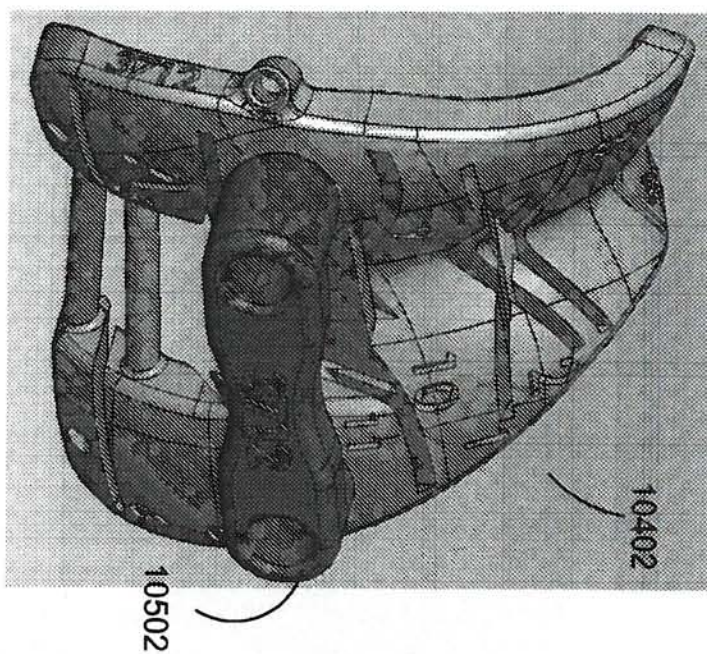


FIG. 108

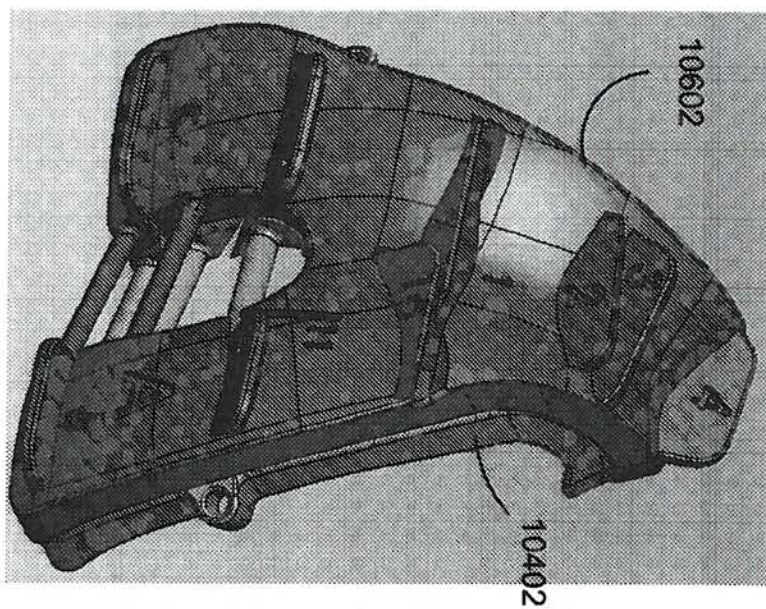


FIG. 109A

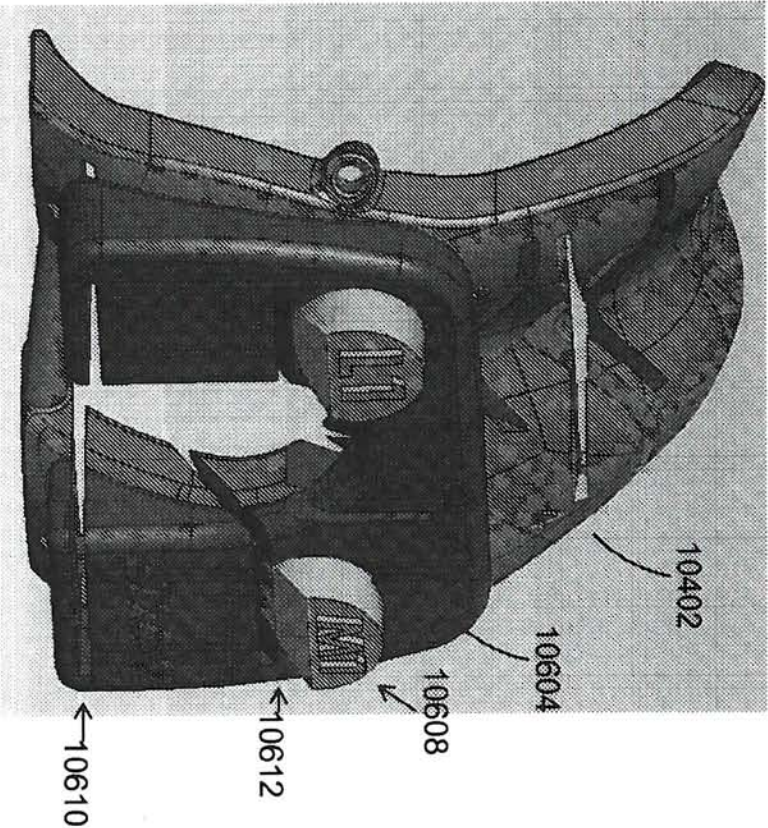


FIG. 109B

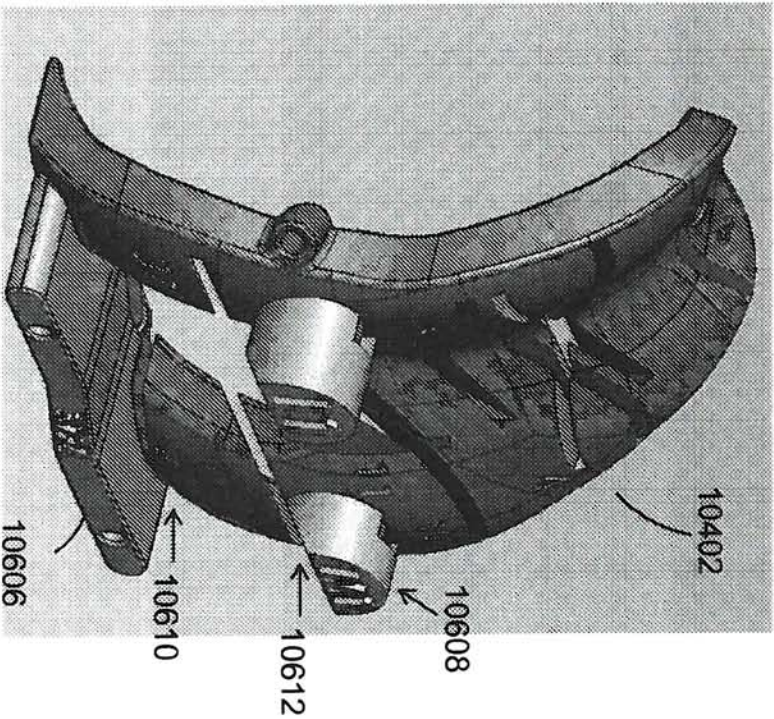


FIG. 109C

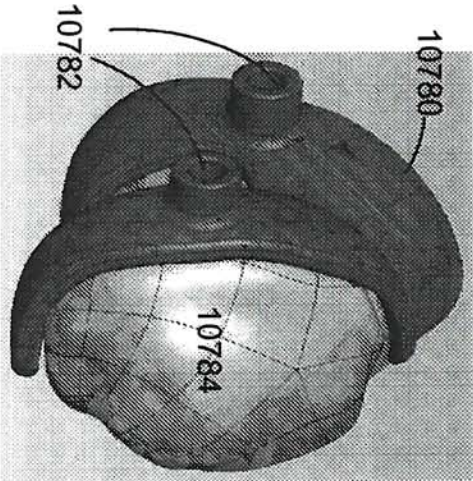


FIG. 110A

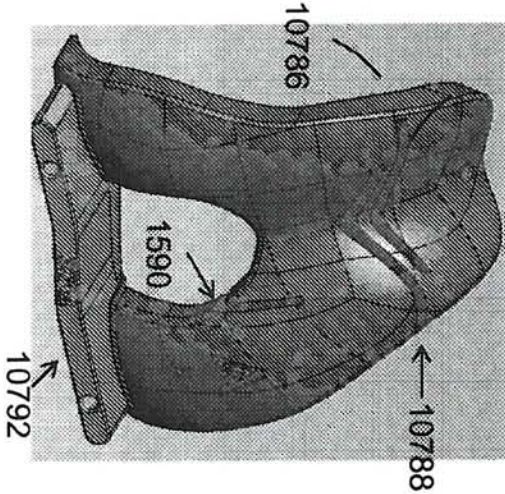


FIG. 110B

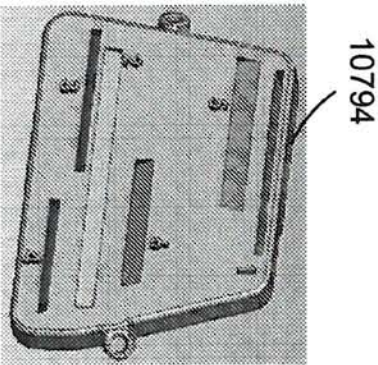


FIG. 110C

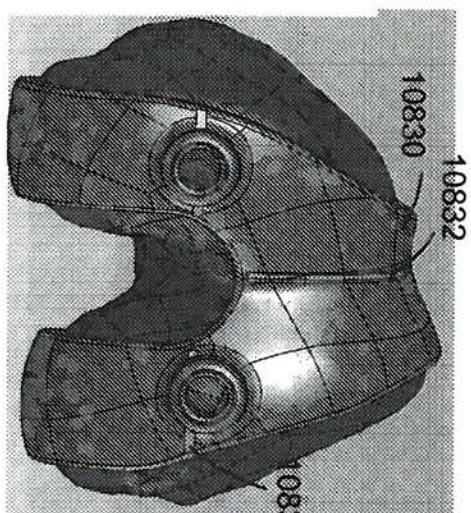


FIG. 111A

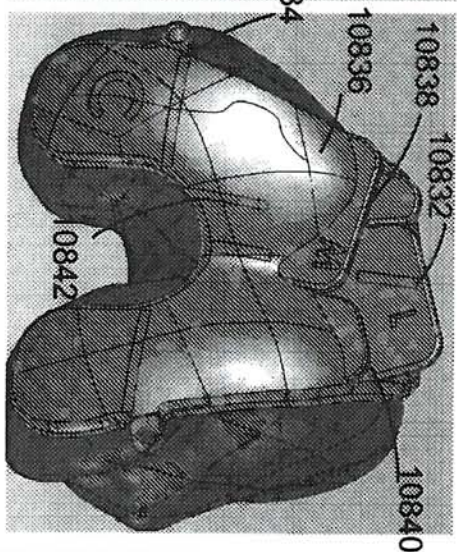


FIG. 111B

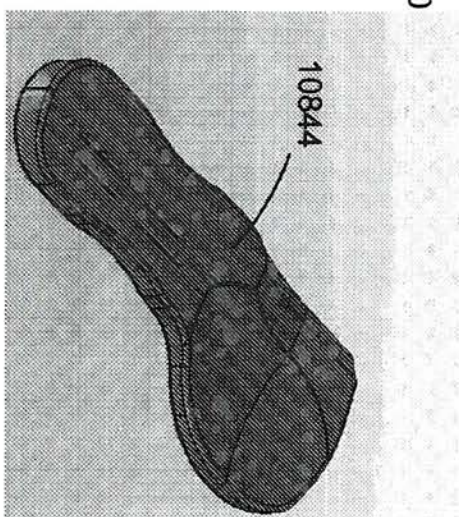


FIG. 111C

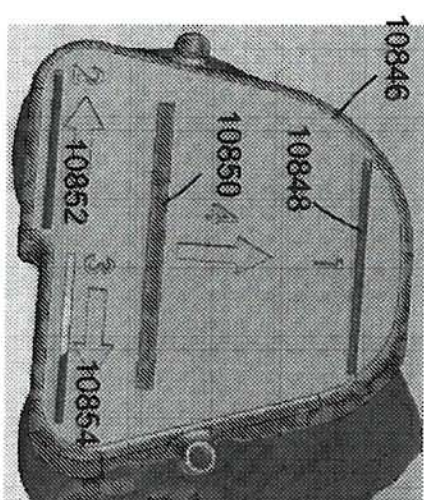


FIG. 111D

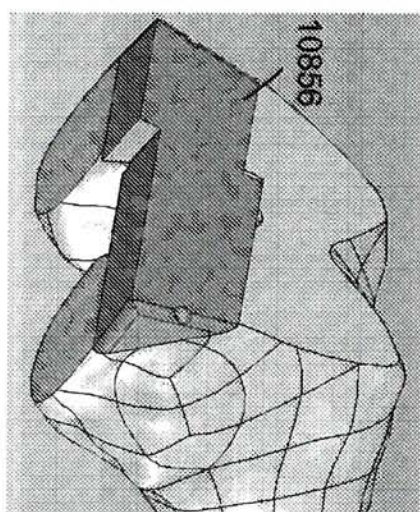


FIG. 111E

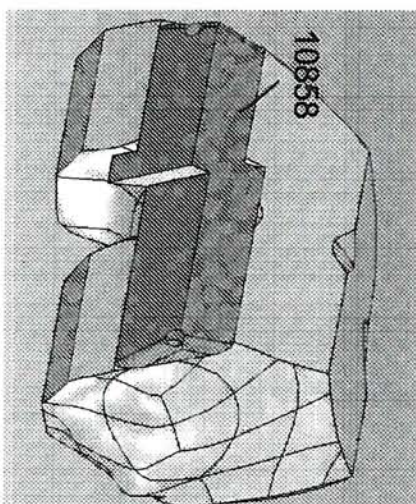


FIG. 111F

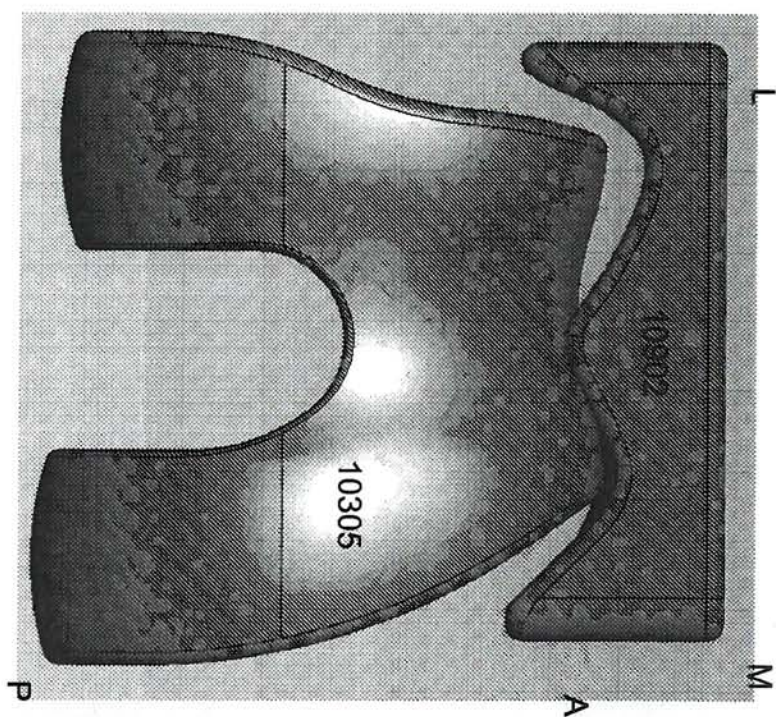


FIG. 112A

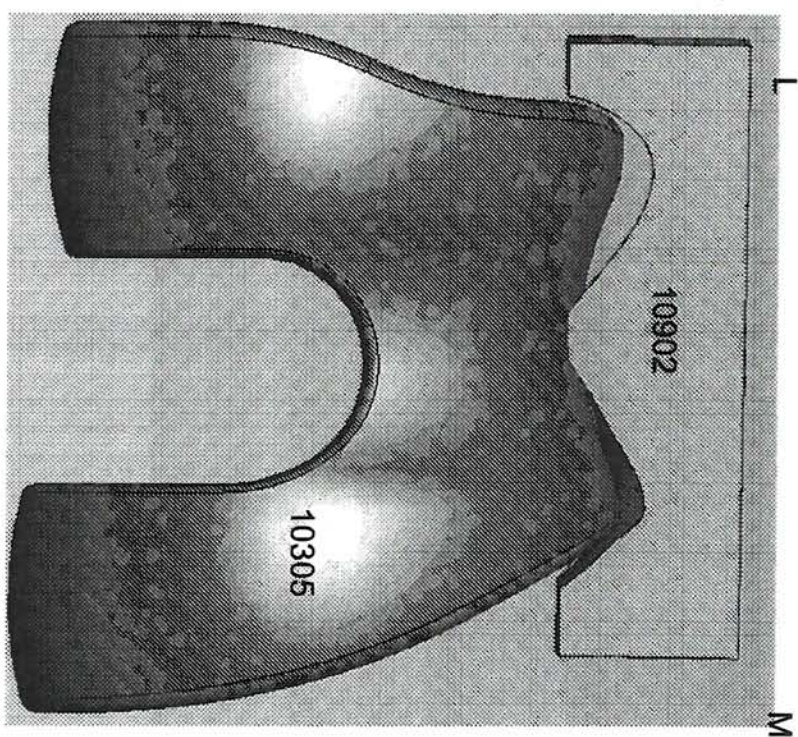
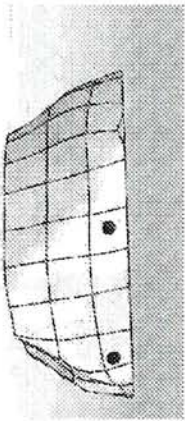
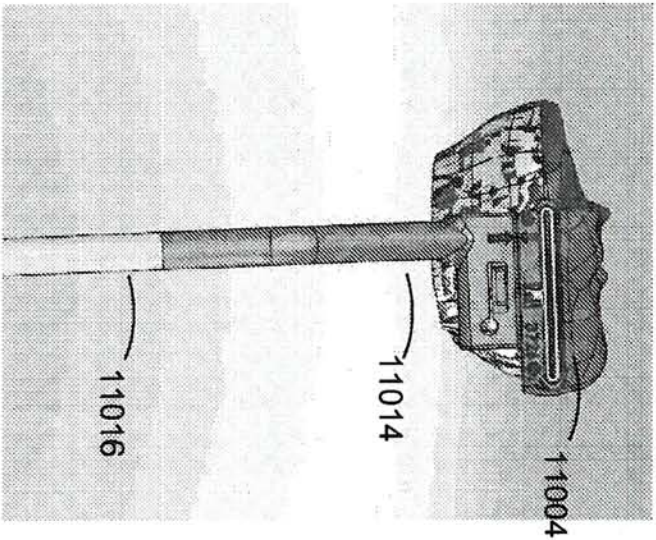
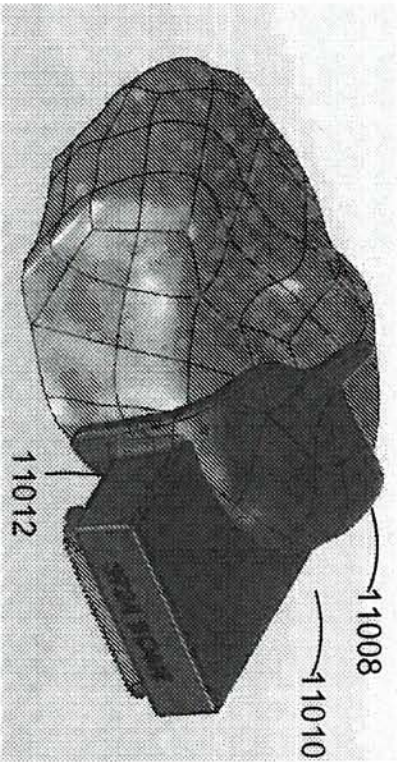
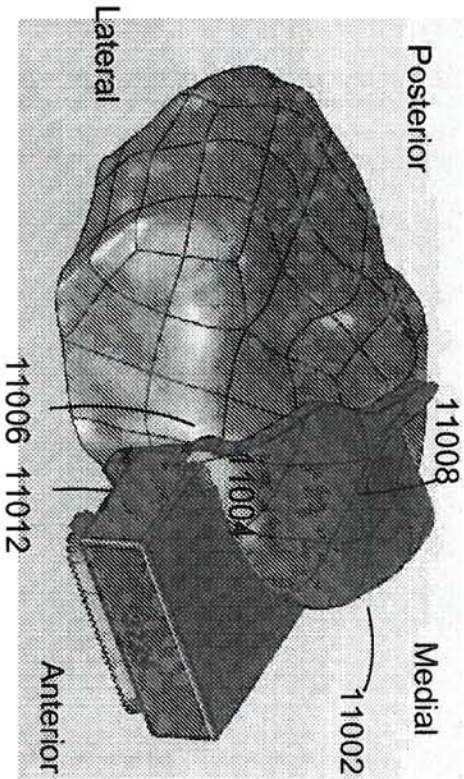


FIG. 112B



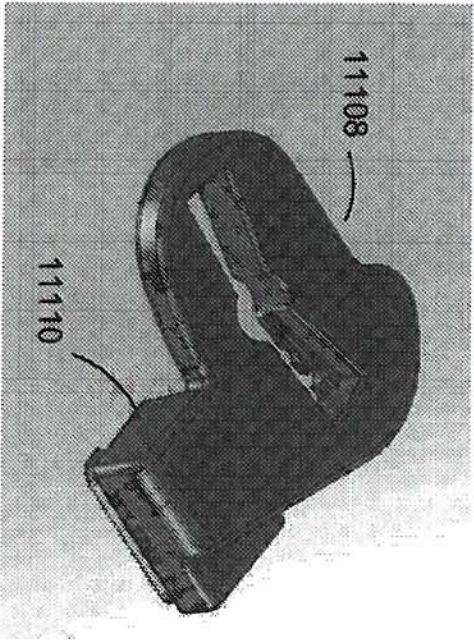


FIG. 114A

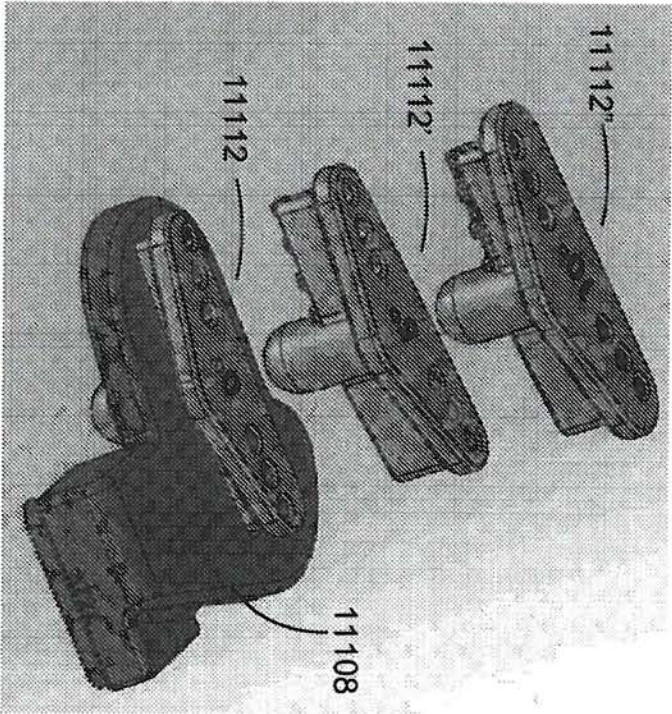


FIG. 114B

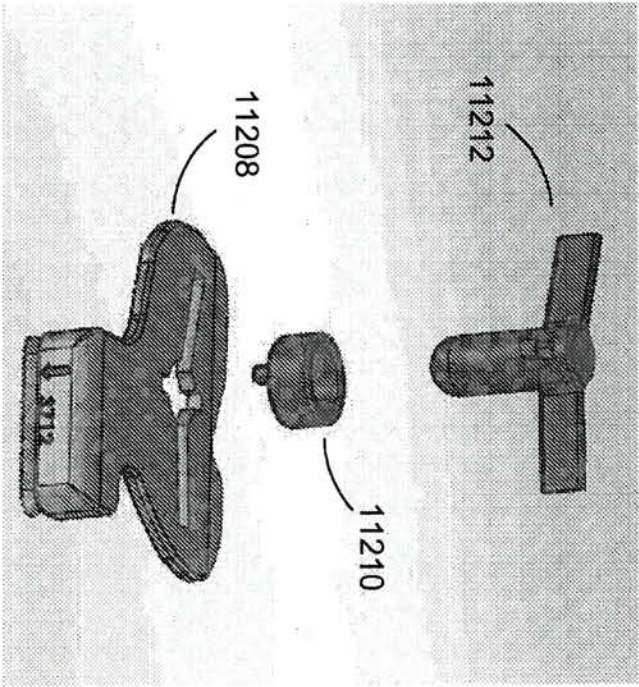


FIG. 115

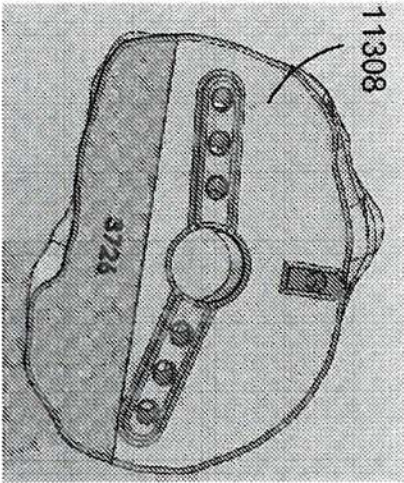


FIG. 116A

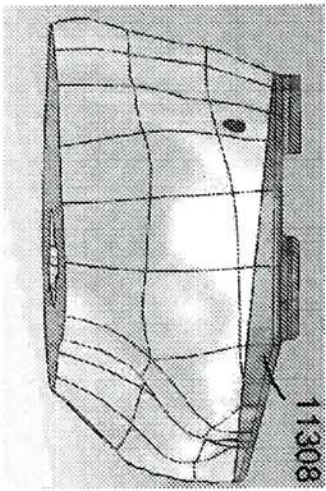


FIG. 116B

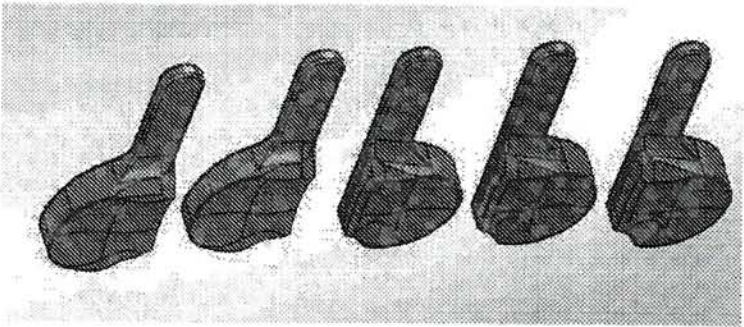


FIG. 117A

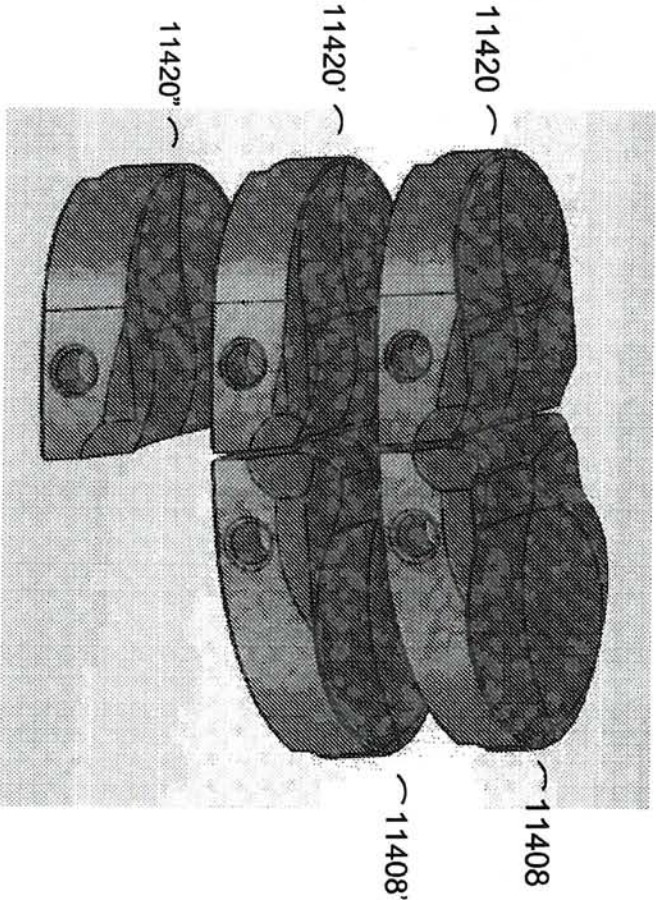


FIG. 117B



FIG. 118A

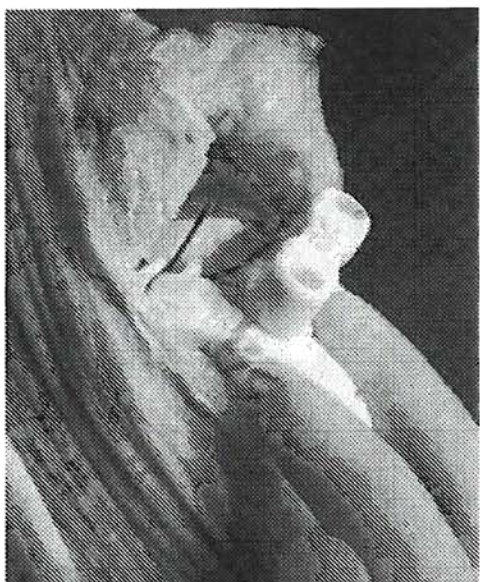


FIG. 118C



FIG. 118B

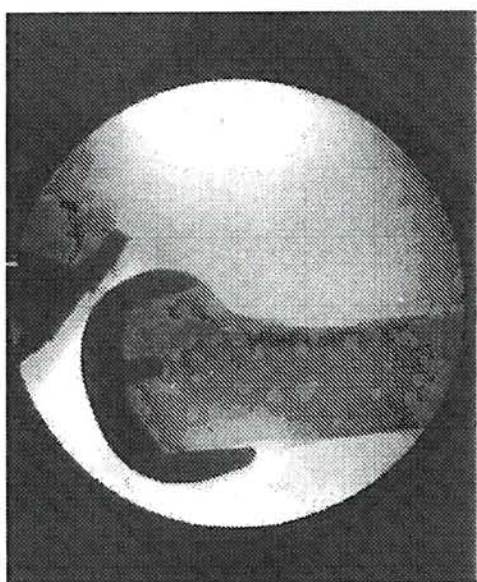


FIG. 118D

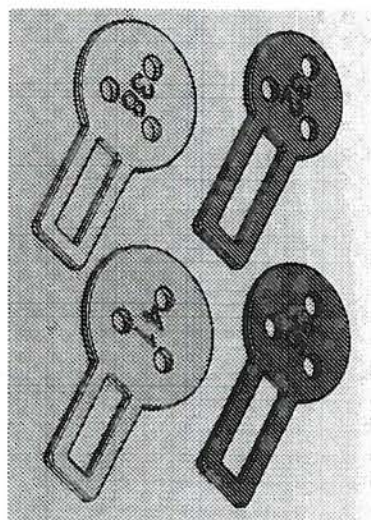


FIG. 119A

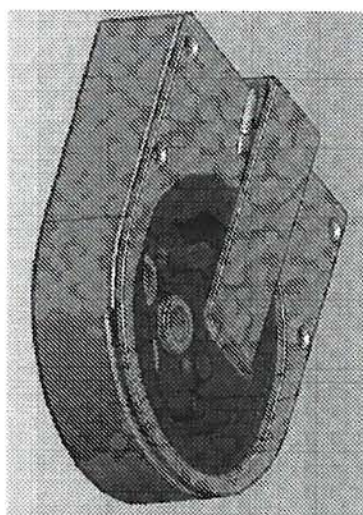


FIG. 119B

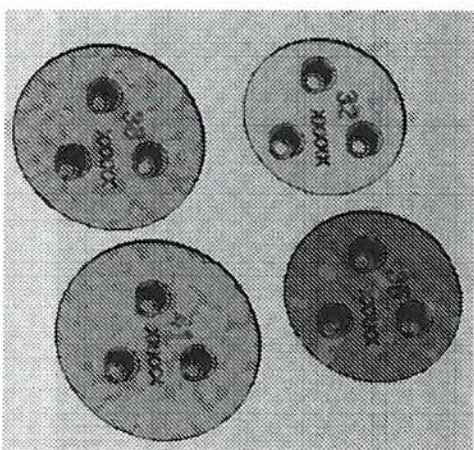


FIG. 119C

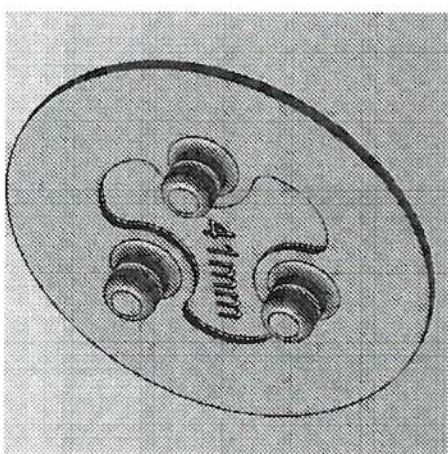


FIG. 119D

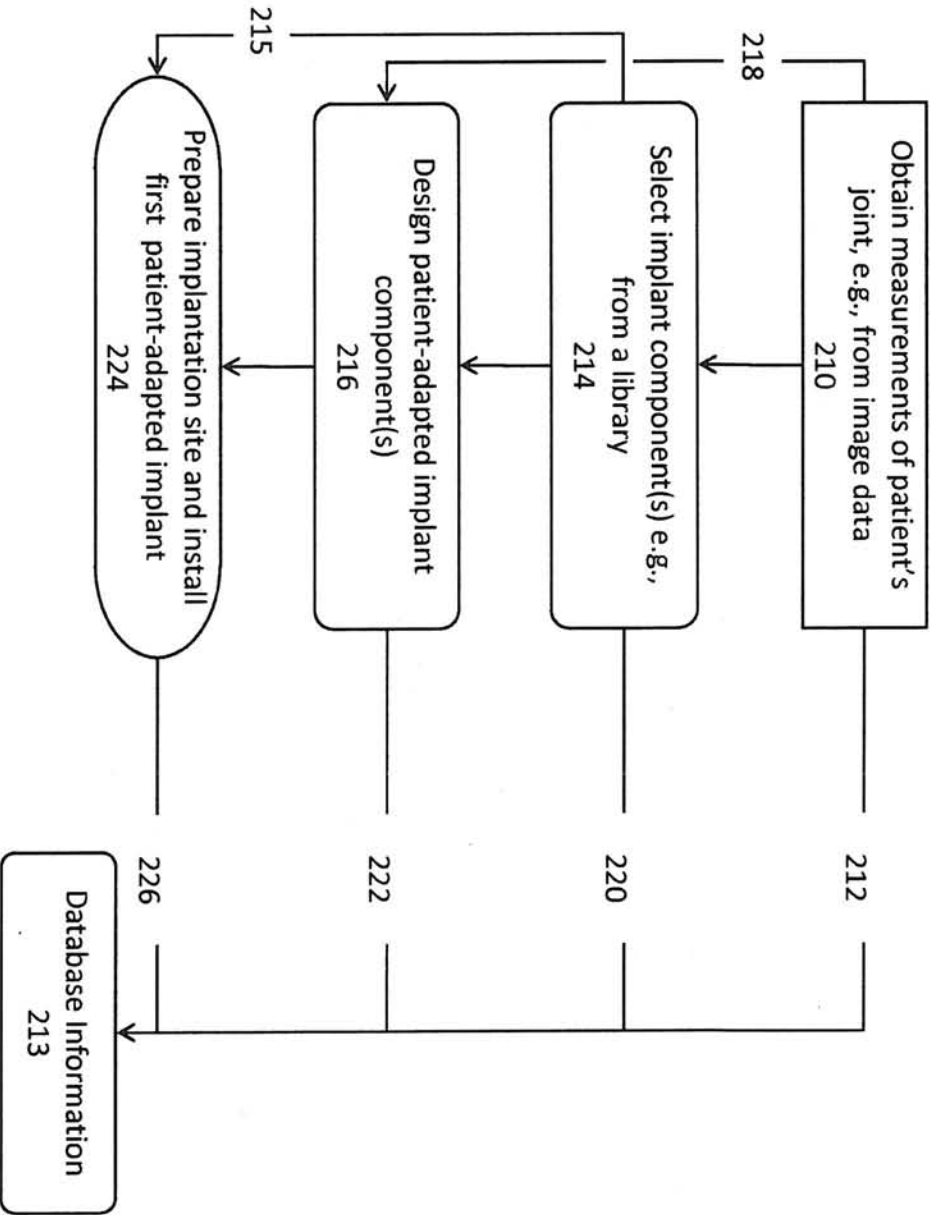


FIG. 120

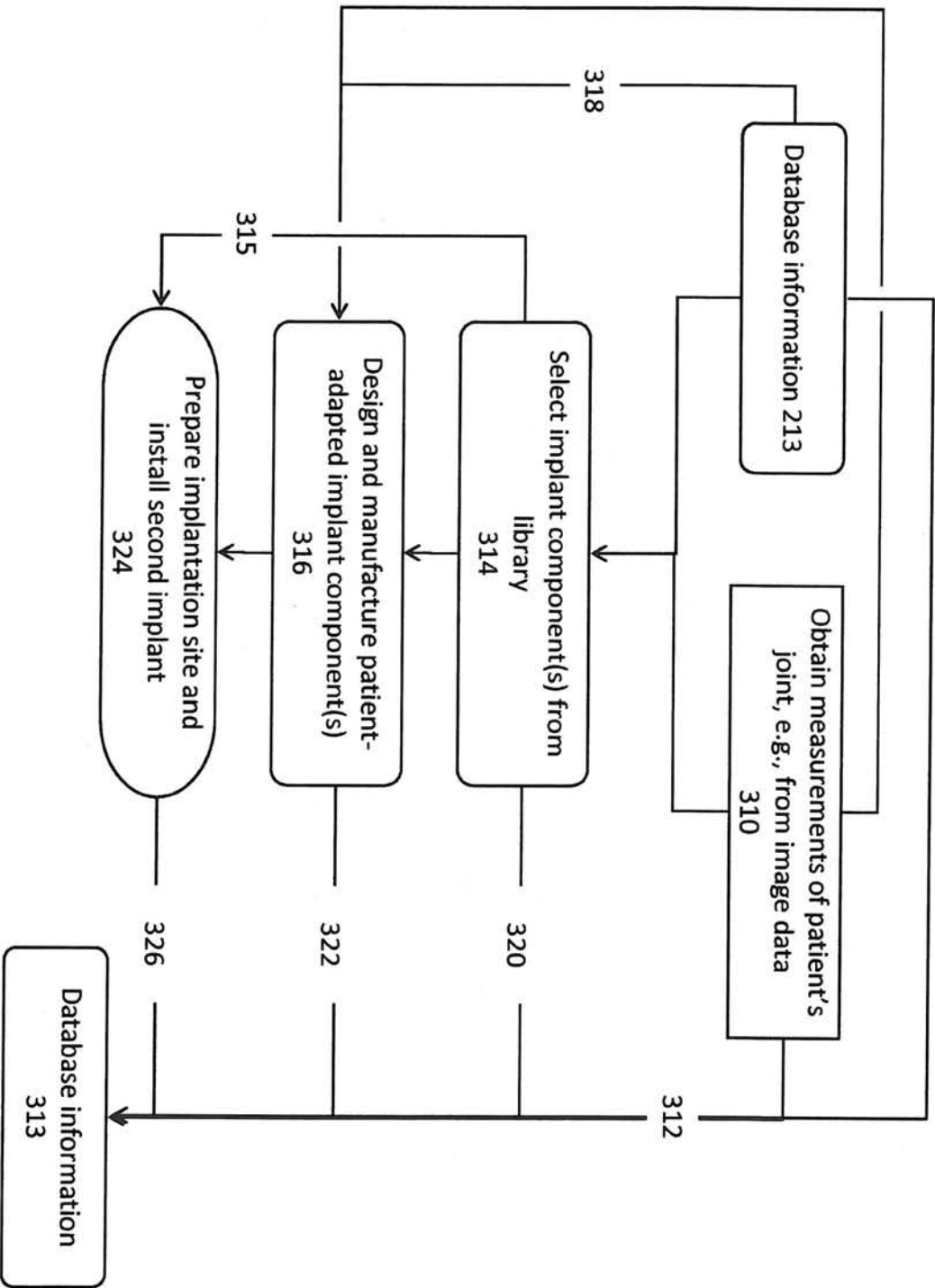


FIG. 121



FIG. 122A

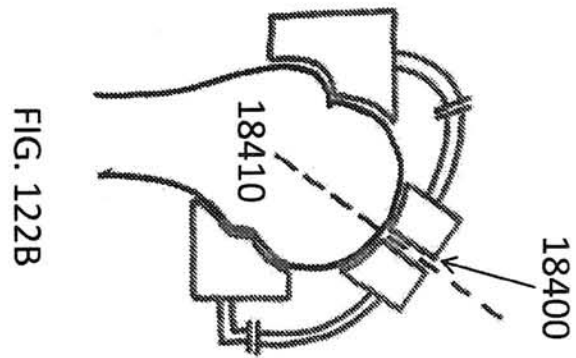


FIG. 122B

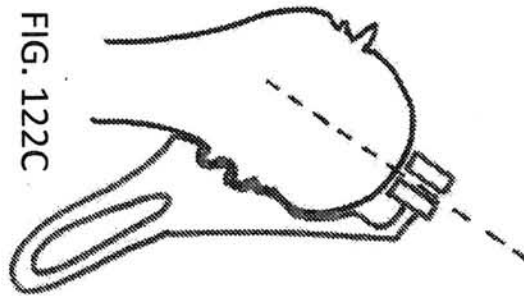


FIG. 122C

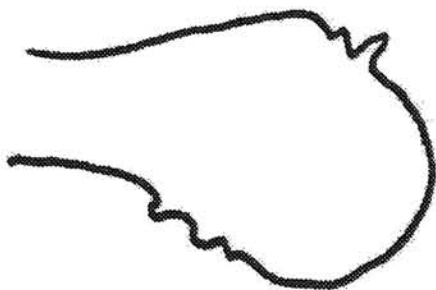


FIG. 123A

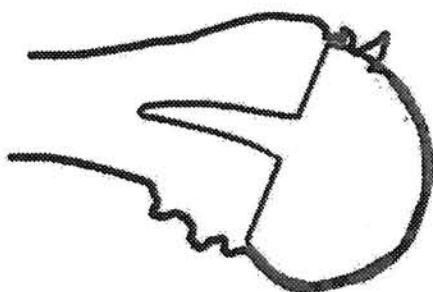


FIG. 123B

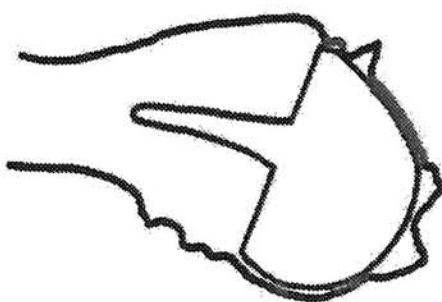


FIG. 123C

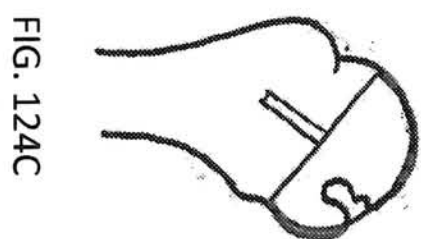


FIG. 125A

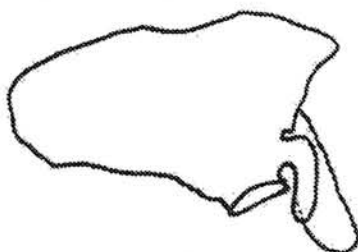


FIG. 125B



FIG. 125C

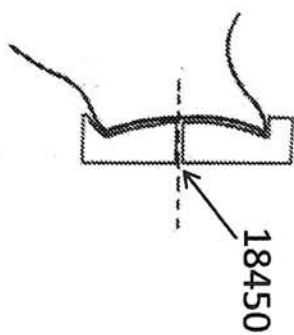


FIG. 125D

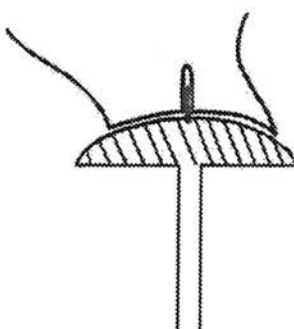


FIG. 126A



FIG. 126B



FIG. 126C

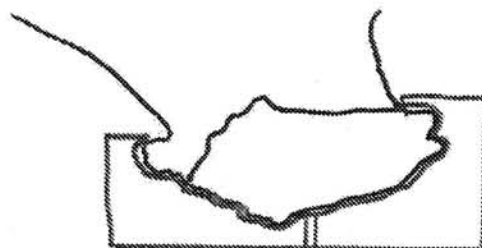


FIG. 126D

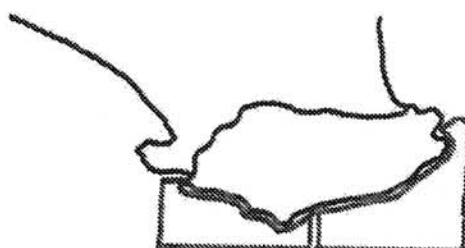


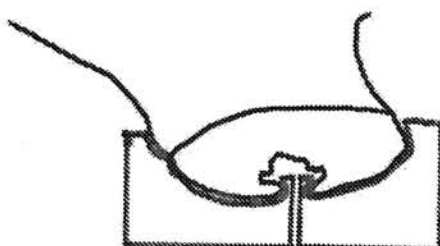
FIG. 127A



FIG. 127B



FIG. 127C



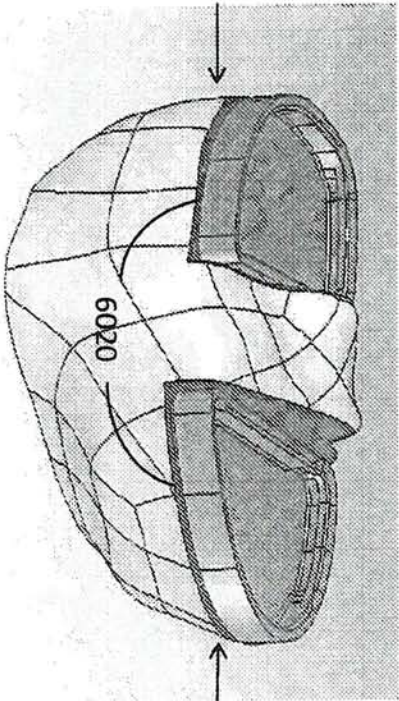


FIG. 128A

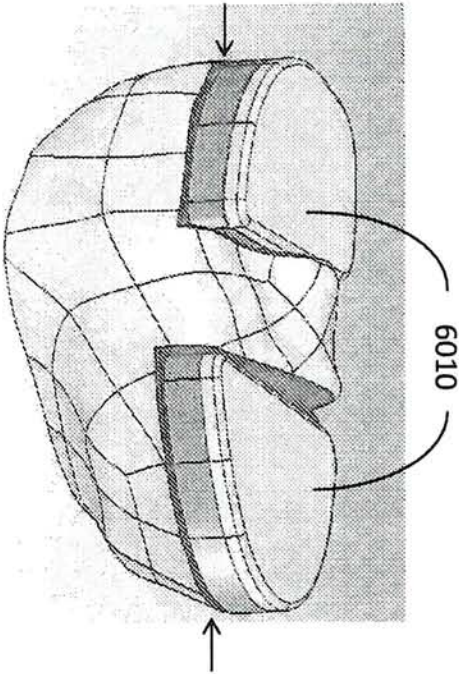


FIG. 128B

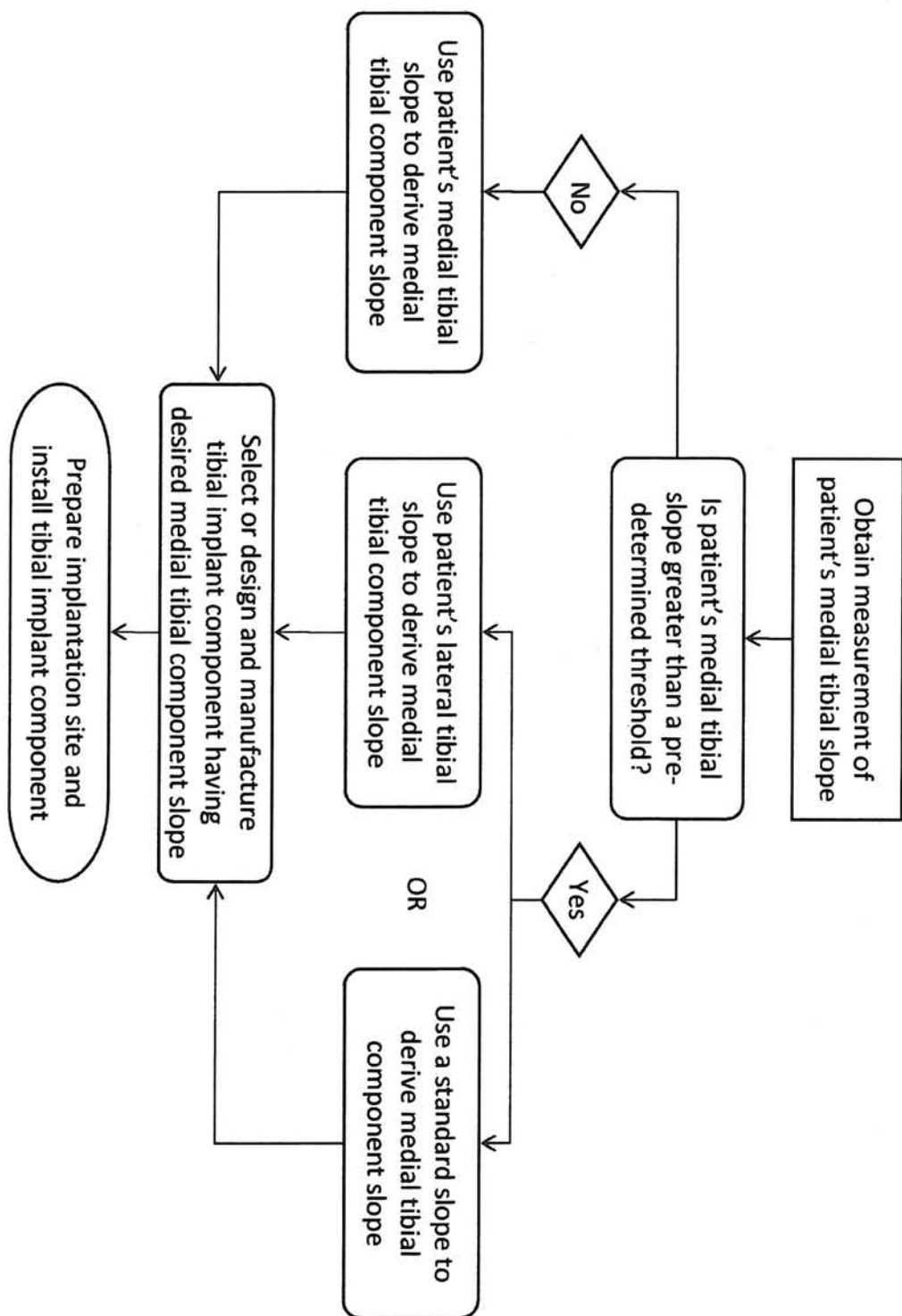


FIG. 129A

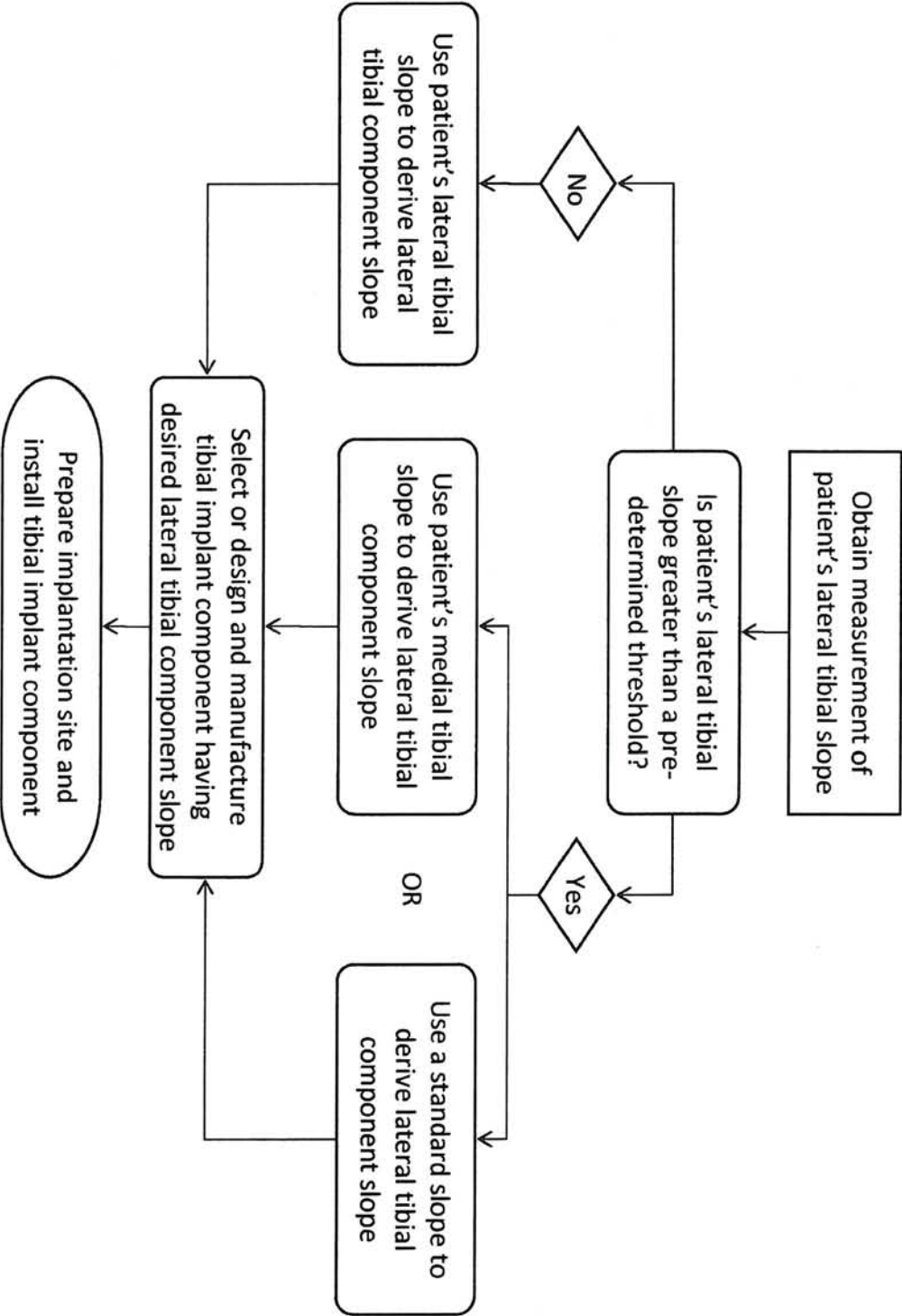


FIG. 129B