

SLIDE 1. Adequate visualization of the stump-socket interface by X-Ray and observation of the femur on the amputated side as compared with the sound side has proven valuable in achieving optimal fit and alignment for the above-knee amputee.

SLIDE 2. Fitzsimons Army Medical Center is using X-Rays taken under weight-bearing conditions to evaluate the support of the stump and mediolateral alignment of the above-knee prosthesis.

SLIDE 3. This is the appearance of a properly aligned and well supported stump as viewed on X-Ray under weight-bearing conditions.

Slide 4. Prior to X-Ray, a small wire is taped inside the socket along the medial and lateral walls to help visualize the stump-socket interface on the X-Ray. A second wire is taped across the posterior brim to show the relationship of the ischial tuberosity to the socket seat.

Slide 5. An anterior-posterior projection is taken utilizing a 14 inch by 36 inch X-Ray cassette with 6 to 1 grid ratio. The amputee stands with equal weight-bearing on both feet with the heels 2 inches apart. Pelvic rotation must be prevented.

Slide 6. The X-Ray is taken at a 72 inch tube film distance with the Central Ray focused at the level of the posterior seat of the prosthesis. These radiographic examinations have been of considerable value in evaluating the following seven (7) points.

Slide 7. No comment - - - 5 second pause.

- SLIDE 8. This illustration indicates that equal adduction may be achieved through proper fit and mediolateral alignment.
- SLIDE 9. The position of the femur in the socket can only be checked by X-Ray. Note that both femurs are equally adducted.
- SLIDE 10. X-Ray studies at Fitzsimons hospital since March 1974, demonstrate that very few above-knee prosthesis built according to standard alignment criteria, achieve proper adduction. On this X-Ray, note the position of abduction of the femur in the socket.
- Slide 11. This X-Ray and the following three (3) X-Rays are further examples of how the position of the femur within the socket can be determined through X-Ray.
- Slide 12. No comment - - - 5 second pause.
- Slide 13. No comment - - - 5 second pause.
- Slide 14. No comment - - - 5 second pause.
- Slide 15. We have found that the degree of adduction of the femur within the socket cannot be determined by the angle of the lateral wall. Note in this X-Ray that the femur is abducted approximately 10 degrees while the lateral wall is in a position of 10 degrees adduction.
- Slide 16. No comment - - - 3 second pause.

SLIDE 17. It is vitaly important to have a properly shaped lateral wall.

SLIDE 18. Through X-Ray, it is possible to detect improperly shaped lateral walls. Notice the bulging of the lateral wall indicating poor distribution of support. As a result of this X-Ray evaluation, this patient was fitted with a new socket as demonstrated by the following X-Ray.

SLIDE 19. Note the proper support and equal distribution of weight along the lateral wall.

Slide 20. This montage shows the prior socket on the left as compared to the more recent fitting on the right.

Slide 21. Pressure problems of the distal lateral stump can also be diagnosed through X-Ray. This X-Ray depicts contact of the distal femur against the lateral wall.

Slide 22. 3 second pause - - - Discrepancies in length may be detected by checking the pelvis and observing deviations in bony landmarks.

Slide 23. The arrows at the femoral heads indicate considerable difference in the height of the pelvis on the prosthetic side. The grid lines on the X-Ray are horizontal to the floor.

Slide 24. No comment - - - 5 second pause.

Slide 25. This illustration indicates the proper positioning of the ischium over the seat of the socket.

SLIDE 26. As viewed on X-Ray, this is the proper positioning of the ischium.

SLIDE 27. This X-Ray reveals a lateral shift of the socket which has resulted in a lack of ischial contact on the seat of the prosthesis.

SLIDE 28. This X-Ray indicates the ischium positioned too high off the ischial seat.

Slide 29. No comment - - - 3 second pause.

Slide 30. This X-Ray reveals a level seat. Note the wire horizontal to the grid lines.

Slide 31. The wire positioned on the posterior seat indicates a seat low on the lateral side.

Slide 32. No comment - - - 3 second pause.

Slide 33. This X-Ray reveals a knee bolt that is not level.

Slide 34. X-Ray can determine the achievement of total contact.

Slide 35. The arrow points out a distal air space indicating lack of total contact of the stump with the socket.

Slide 36. X-Ray pictures are taken before the prosthesis is finished so that deviations from optimal alignment may be recognized and corrected. The X-Ray on the left, showing the unfinished prosthesis, revealed insufficient femur adduction. - - - 3 second pause. The

SLIDE 36 Continued,

X-Ray on the right revealed that the necessary corrections were made. The Prosthesis was then finished.

SLIDE 37. Based upon studies at Fitzsimons Army Medical Center, the standard alignment criteria used to fabricate this prosthesis failed to achieve proper femoral alignment as demonstrated by this next X-Ray.

SLIDE 38. No comment - - - 5 second pause.

Slide 39. This X-Ray of the former prosthesis demonstrates how improved socket support and mediolateral alignment can be obtained through Radiographic evaluation. Note the uneven Ischial seat, the abducted position of the femur, and the tilted knee bolt.

Slide 40. This X-Ray of the new prosthesis, modified as a result of the previous X-Ray evaluation, demonstrates improved socket alignment. Note the level seat, the adducted position of the femur, and the level knee bolt. A Look Through The Above-Knee Prosthesis by X-Ray evaluation has proven to be an objective tool in achieving optimal fit and alignment for the above-knee amputee.

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