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S-N-S Knees and the Bilateral A/K Amputee

Gustav Rubin, M.D.*

A.H., an active bilateral A/K ambulator.

We have under our care at VAREC eleven adult male bilateral A/K *ambulators*. Ten of these use Swing and Stance (S-N-S) knees and one, a missionary to a remote area in Africa, was fitted with single axis knees because of the obvious need for simplicity in his special circumstances. Eight of our S-N-S users are active individuals, but two are household and limited community ambulators. As would be anticipated, all of our above-knee amputee ambulators are in good physical condition and strongly motivated. These were important aspects in prescribing prostheses. The S-N-S knees provided the amputees with the smooth gait characteristic of hydraulics, greater security, improved ease in reaching the sitting position, improved opportunity to recover from sudden stops or potential stumbles, better control when descending stairs, and the ability to lock one or both knees for negotiation of stairs. We have also found the S-N-S to be the sturdiest of the hydraulic units.

*FACS Chief, VAREC Special Clinic Team

No one of our amputee veterans demonstrates the potential of S-N-S knees better than A.H., injured in Vietnam at 21 years of age. A. H. was initially evaluated by the VAREC Clinic Team over one year later on Sept. 24, 1970.

A.H. sustained bilateral A/K amputations. The right A/K stump was eight inches in length and multiply scarred. The left A/K stump, partially covered by healed split thickness skin grafts, was seven and one-half inches in length. A.H. also sustained partial amputations of the fingers of both hands. The index and middle fingers of the left hand were amputated; on the right hand, the proximal phalanges of the fourth and fifth fingers and the first metacarpal of the thumb were retained. A.H. demonstrated that he was capable of grasping crutches with both residual hands. On the right he could come within an inch of opposing the first metacarpal to the fourth and fifth proximal phalangeal stumps. Opposition could be achieved on the left.

A.H. was in excellent physical condition, very well motivated, without hip contractures, and with good muscle power of the trunk and residual extremities. He had been working out in his garage, which he had converted to a gym. When seen, he weighed 160 lbs. and indicated that his pre-amputation height was 6 feet, 1-½ inches (a height that was subsequently successfully reachieved at his request).

The VAREC Clinic Team decided to prescribe bilateral A/K partial suction quad sockets with waist belt, rigid uprights and band, multiplex knees (to allow trial of several knee units "in the rough"), and, finally, a trial with first SACH feet, and then single axis feet. The S-N-S knee units and single axis feet were selected on the basis of A.H.'s performance with them.

On May 13, 1971 A.H. walked to VAREC without a cane or crutches. After a subsequent trial with total suction and silesian belts he had to be returned to his original prescription, due to stump scarring.

A.H. had been an accomplished skier prior to amputation and, on January 25, 1974, requested prostheses with which he could ski again. The clinic team notes of that date follows.

"He has been informed that skiing will be dangerous. Nevertheless, he is anxious to try it, and, because of the morale factor and the intensity with which this patient wishes to ski, plus the fact that he was a skier prior to his leg amputations, the prostheses have been ordered." Outrigger ski poles with special adjustments for the hand grips were also prescribed.

The first prescription was determined after another bilateral A/K skier was invited to visit the clinic team with his prostheses. That concept was copied and prostheses were supplied to A.H. with solid knees fixed at 45 degrees and correspondingly dorsiflexed feet. They were rejected shortly thereafter by A.H. since they allowed him to slide down only low slopes.

The prostheses with S-N-S knees and single axis feet however, did allow him to actively ski. It is noteworthy that the most efficient position of his stumps, since he required strong abductor power for skiing, was found to be in sockets set up in almost twenty degees of abduction. Since the neutral position of the feet was more efficient for skiing the feet were not out-toed.

A.H. proved his proficiency on skis (see photo) by winning the handicapped olympics in Norway in 1982. He has competed in numerous events in the U.S. and overseas and he reports that he can negotiate 40 slalom gates in 60 seconds.

He has not been trouble free, however. The most serious of his problems occurred when a spur was removed from his left stump and overlying soft tissue breakdown occurred. Although this healed secondarily, the clinic team advised that the area be covered by adequate soft tissue. This was done and the amputee had no further difficulty. A.H. continues to be active and, in addition to skiing, sails his own boat.

Not all amputees, however, follow the same road to successful ambulation. At one time, the clinic team believed they had two patients who had the potential and motivation to ambulate. The team provided prostheses but the patients became obese and gave up the effort. The rehabilitation of one, a triple amputee (BE on one side) was, unfortuntately, a notable failure.

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