Where is the worst radioactive contamination on the planet?

Hanford, Washington

- Military plutonium enrichment program since 1942
- 40 billion gallons of nuclear wastewater dumped into the soil over 60 years
- More than 200 sq. miles are contaminated
- Will not support human life for 10,000 years
- 20 tons of plutonium still stored there
- Only 2 pounds needed to create a primitive nuclear bomb

Upper Limb Amputation Functional Outcome

Heikki Uustal, MD
JFK-Johnson Rehab Institute
Edison, NJ

There are very few studies that investigate long-term functional outcome in upper limb amputation, and there are no standards on what parameters to study.

Overall there appears to be less functional use of upper limb prostheses than lower limb prostheses, possibly because the unilateral upper limb amputee can be independent in self care without a prosthesis.

If we take into account the discomfort, inconvenience, weight, and limited cosmesis of most prostheses, then it is no surprise that many patients use their device on a limited basis or none at all.

Bilateral upper limb amputees are much more dependent on their prosthetic devices, and therefore more likely to use them regularly.

Several functional assessment tools have been developed over the years (FIM, Bartels, NYU, RIC), but they look at functional tasks, not prosthetic use during a task. The patient may become very proficient at performing many tasks without the prosthesis.

Wearing time of the prosthesis may not correlate to any functional use of the prosthesis.

Some specialized amputee centers will establish individualized functional goals, involving prosthetic use, for each patient, but then there is no way to compare a population of patients.

Pinzur, 1994, J Hand Surg

- Studied 19 traumatic upper limb amputees over 9 years
- 11 TRA, 5 THA, 3 SD
- 18 fitted with prosthesis
- 15/18 used prosthesis on a daily basis

Jones, 1995, Disabil Rehabil

- Follow-up study of 27 upper limb amputees
- All levels included
- Time since amputation ranged 5-15 years
- Only 37 % were using prosthesis >8 hr/day
- Occasional use by another 18 %

I did my own study at Baylor to assess long-term functional outcome in 1987

Population

- Includes: All unilateral upper extremity amputees seen at TIRR for initial visit, 1977 – 1985
- Excludes: Partial hand amputation
  Congenital amputees
  Patients who already had prosthesis

Functional Outcome Categories

- Did not receive prosthesis
- Not wearing prosthesis
- Cosmetic use only
- Gross motor activities with prosthesis
- Fine motor activities with prosthesis

Data Gathered

- Age
- Sex
- Right/Left limb loss
- Dominance
- Level of amputation
- Etiology of injury
- Time to initial visit
- Time to prosthesis
- Functional outcome
- Wearing time
- Work status
- Complications
- Duration of follow-up
- Number of visits
- Type of prosthesis
- Method of payment

Patients who met criteria = 103 (100%)
Patients contacted for follow-up = 93 (90%)

Follow-up Group Statistics (N=93)

Sex: Male 85% Female 15%

Dominant Limb Loss: 50%

Average Age	Age Distribution		Age Range
31.2	15 – 24	41%	15 – 62
	35 – 44	19%	
	45 – 54	12%	
	55 – 64	5%	

Etiology

Mechanical Trauma	69%
Electric/Burn injury	16%
Brachial Plexus injury	9%
Cancer	4%
Vascular injury	1%
Infection	1%

Method of Payment

Workman's Comp	56%
Private Insurance	44%

Level of Amputation

S/D	Shoulder disarticulation, forequarter, very short above elbow fitted as S/D
A/E	Above elbow, elbow disarticulation
B/E	Below elbow
W/D	Wrist disarticulation

Distribution by Level

Level	Number	Percent of total	Percent of level Receiving Prosthesis
S/D	19	(20%)	68%
A/E	29	(31%)	86%
B/E	36	(39%)	89%
W/D	9	(10%)	100%

Complications

Delayed healing (more than 4 weeks post-injury)

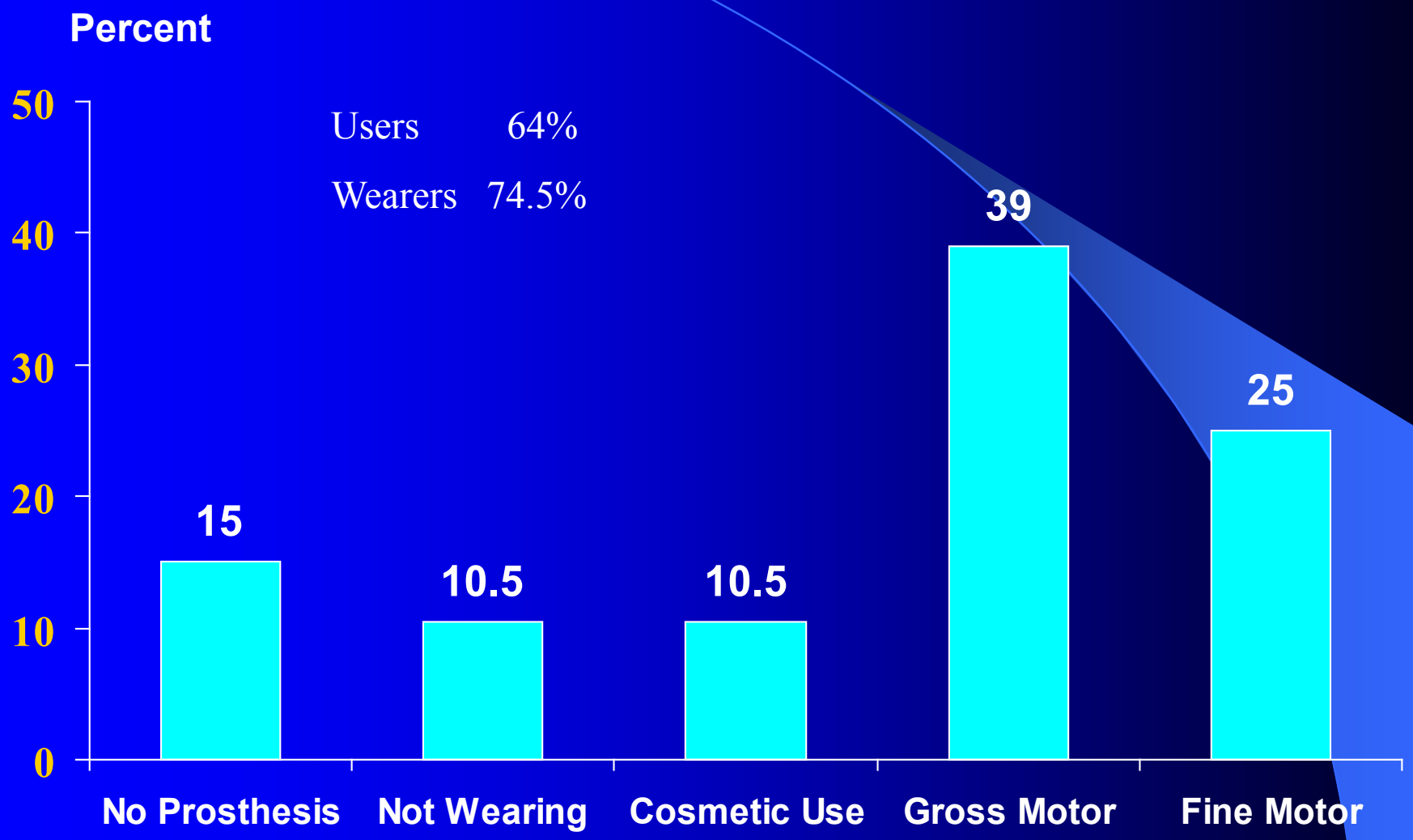
Revision of stump (more than 1 week post-amputation)

Prolonged initial course

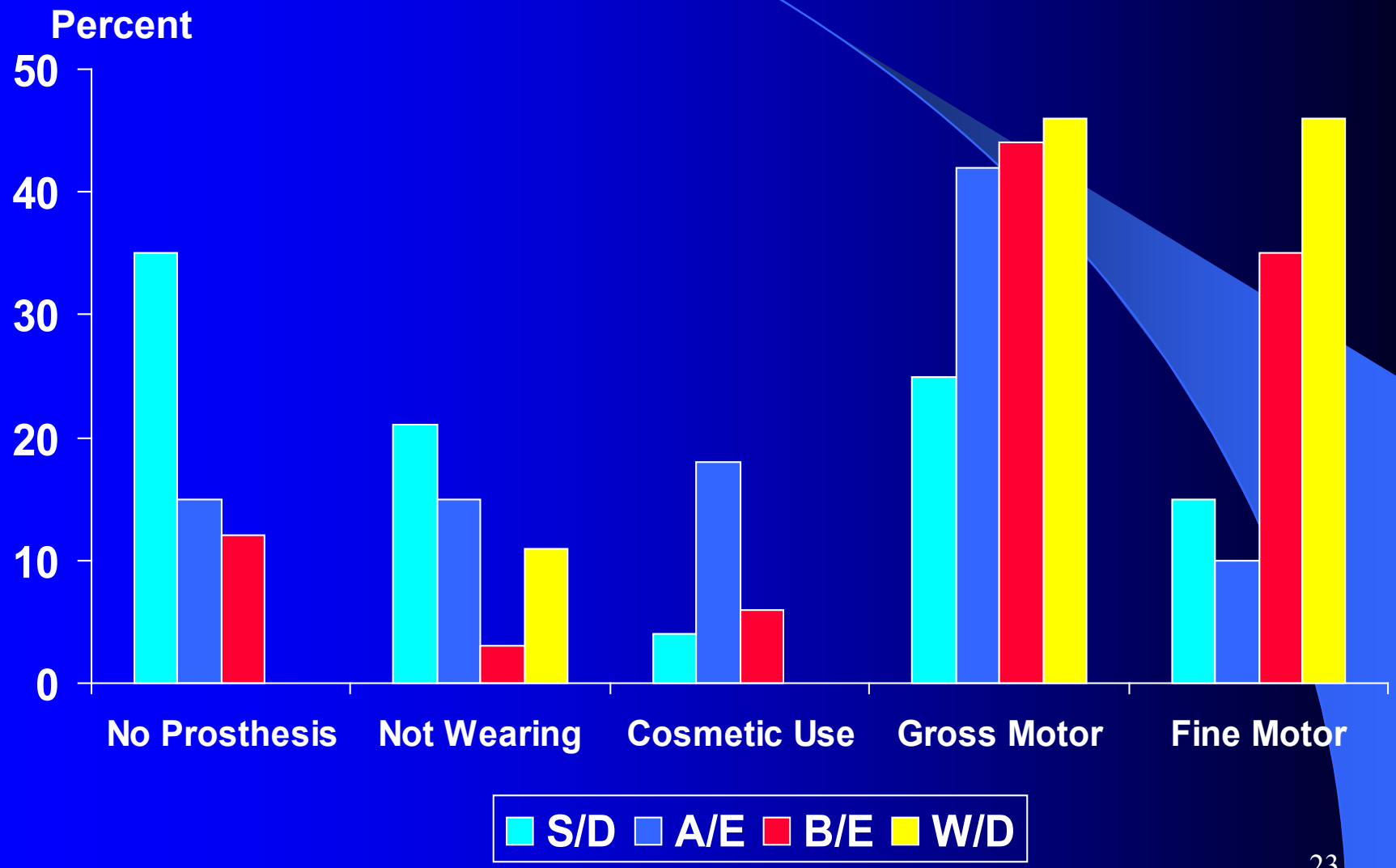
Associated major trauma

Pain – stump or phantom pain requiring meds or injection more than 4 weeks post-amputation

Functional Outcome by All Levels



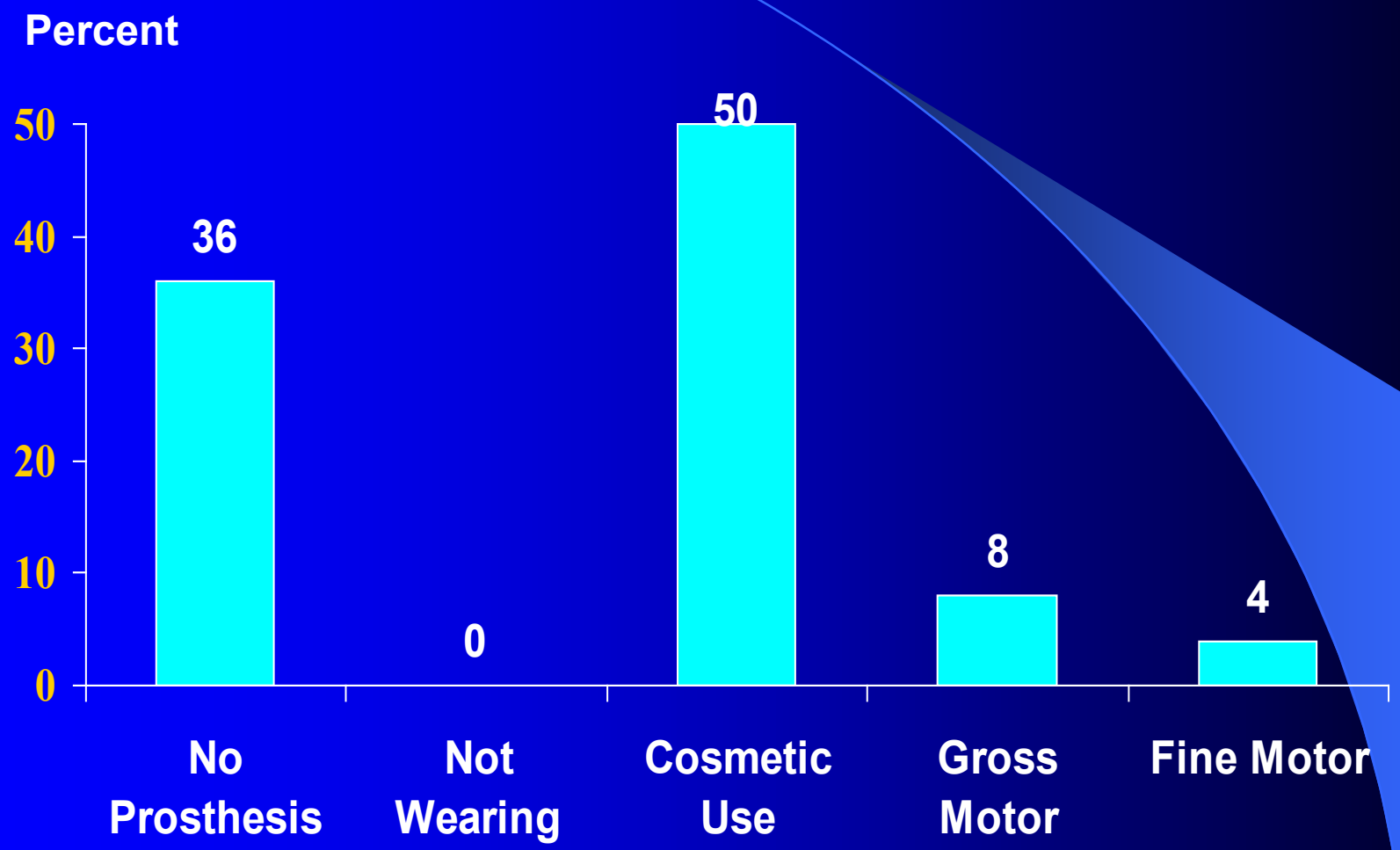
Functional Outcome by Level



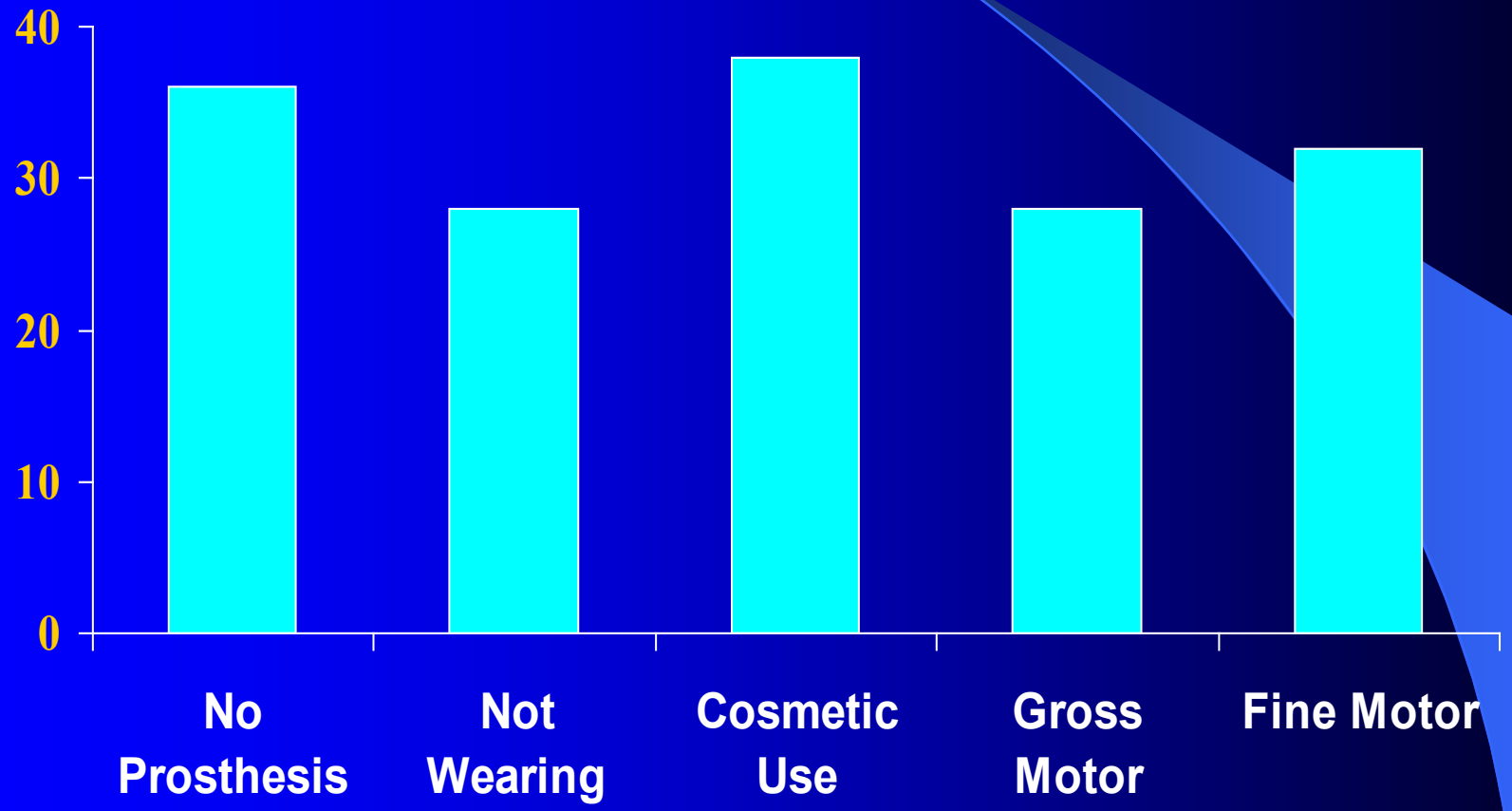
Functional Outcome by Level

Level	Wearers	Users
S/D	47%	42%
A/E	72%	51%
B/E	86%	78%
W/D	89%	89%

Functional Outcome for Females



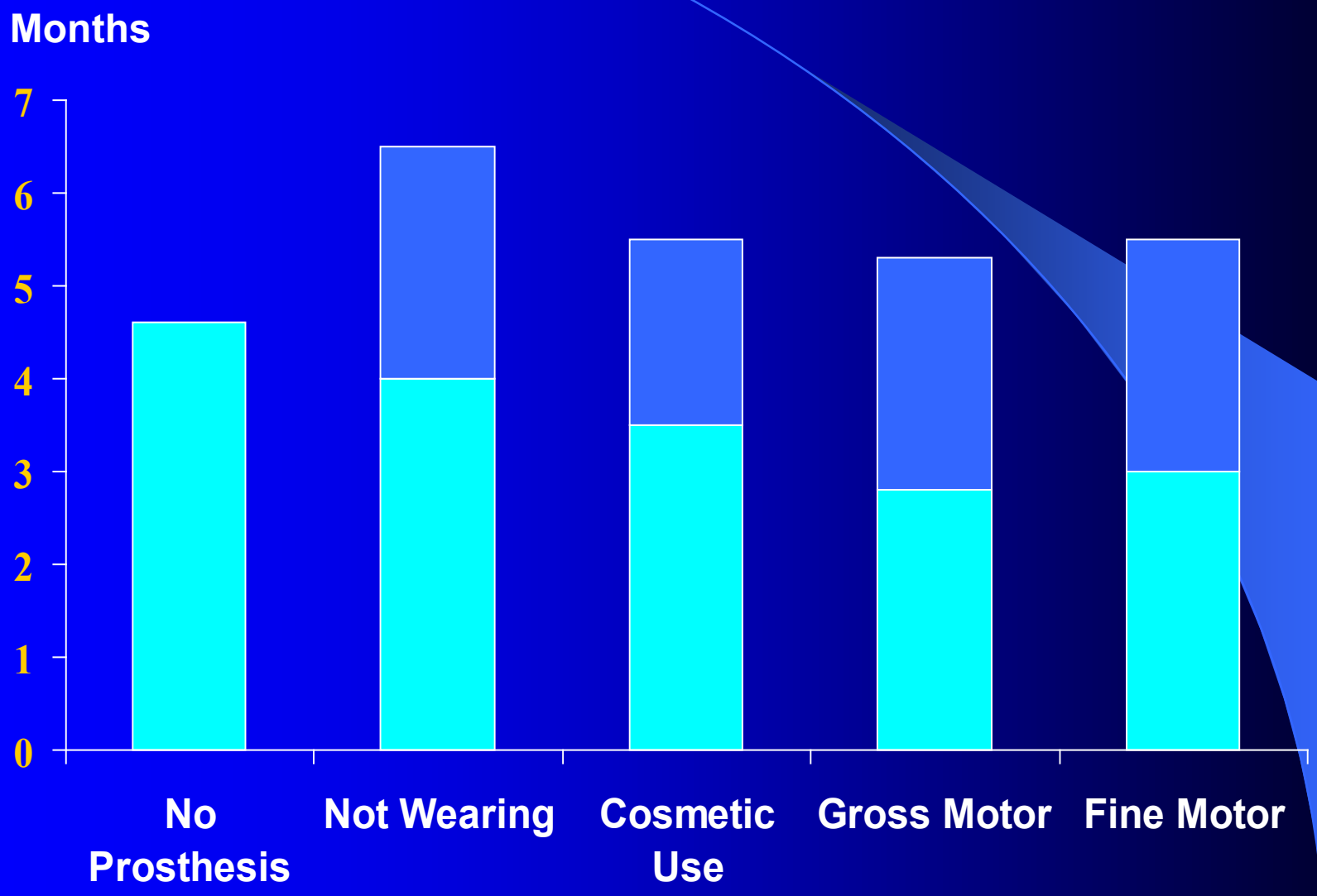
Functional Outcome by Age



Functional Outcome by Age

Age	Wearers	Users
15-19	72%	65%
20-24	71%	71%
25-34	81%	62%
35-44	83%	72%
45 +	63%	44%

Functional Outcome by Time to Prosthesis



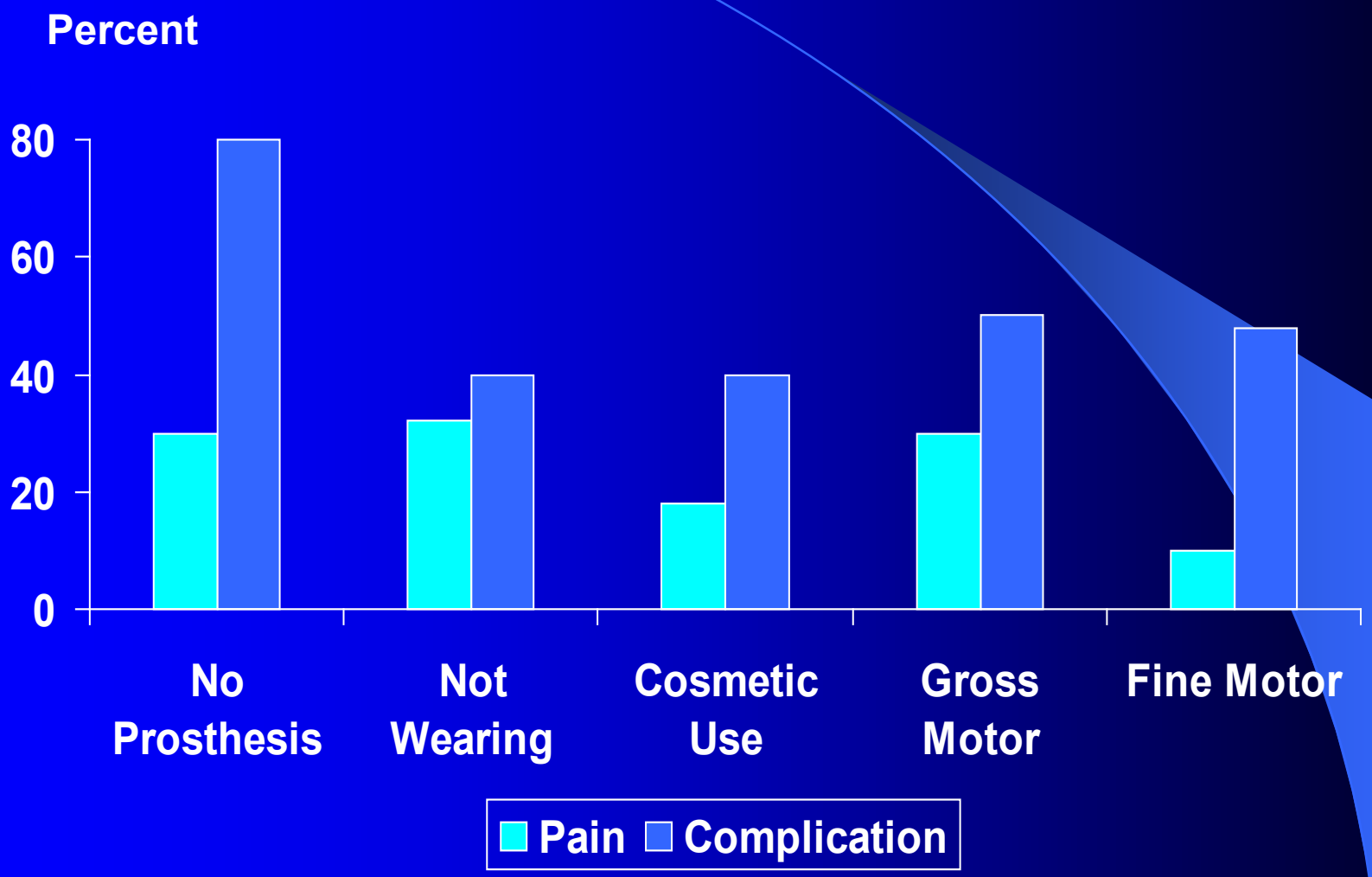
Follow-up

Level	Total F/U	Average F/U Visits	Average Wearing Time
S/D	12 MO	1.6	42 HR/WK
A/E	23 MO	3.9	44 HR/WK
B/E	28 MO	3.4	60 HR/WK
W/D	9 MO	1.7	59 HR/WK

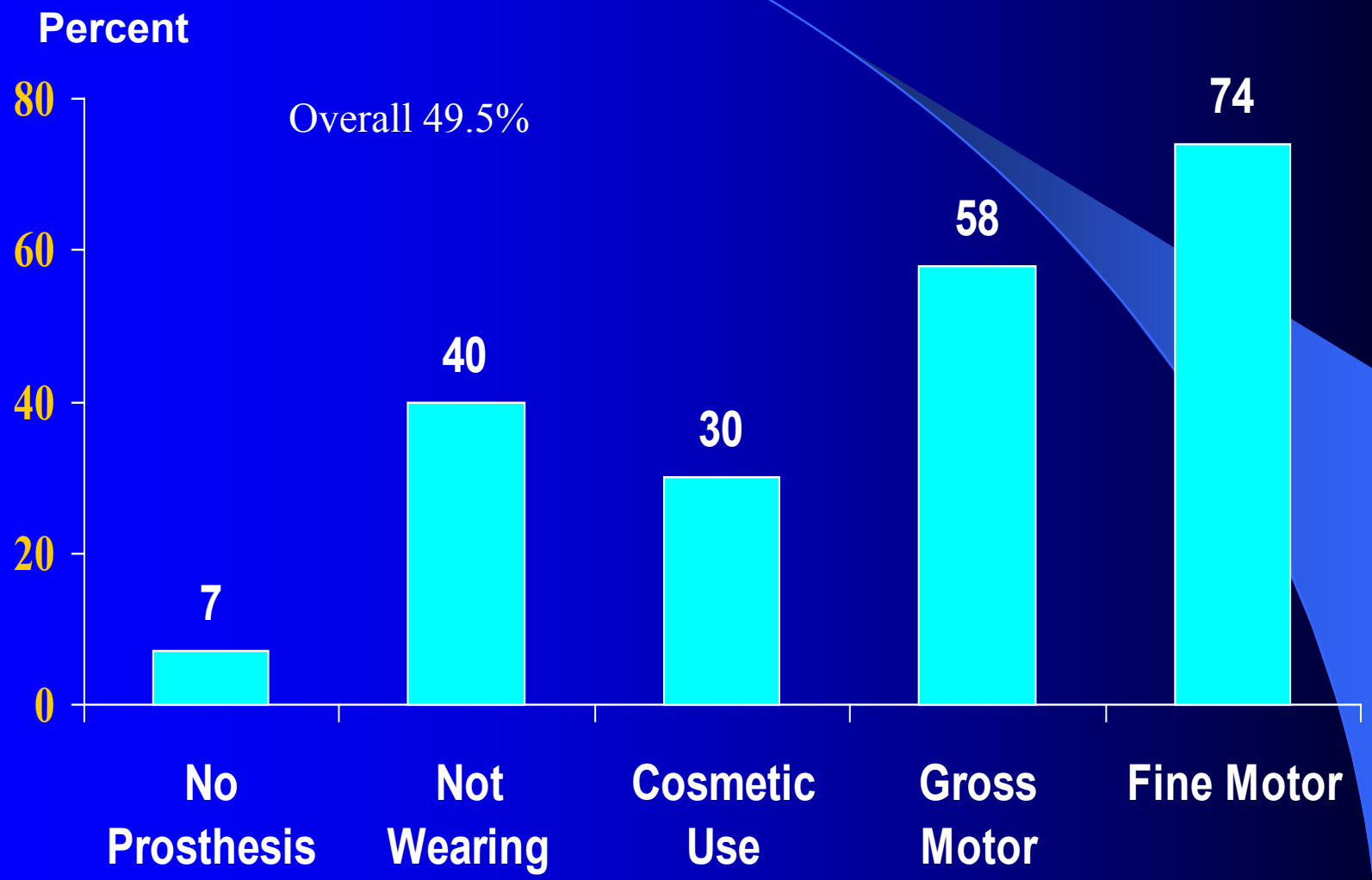
Average F/U time = 21/3 MO after prosthesis

Functional Outcome by Follow-up after Prosthesis

Functional Outcome by Pain &Complications



Functional Outcome by Return to Work



Post Injury Work Status

Level	Returned to work
S/D	32%
A/E	41%
B/E	61%
W/D	67%

Returned to work	Pain	Insurance Worker's Comp	Insurance Private
YES	17%	65%	35%
NO	30%	47%	53%

Conclusions

- Patients with more distal amputation will have better functional use of the prosthesis and better chance of return to work
- Females tend to selectively use a prosthesis for cosmetic reasons/activities

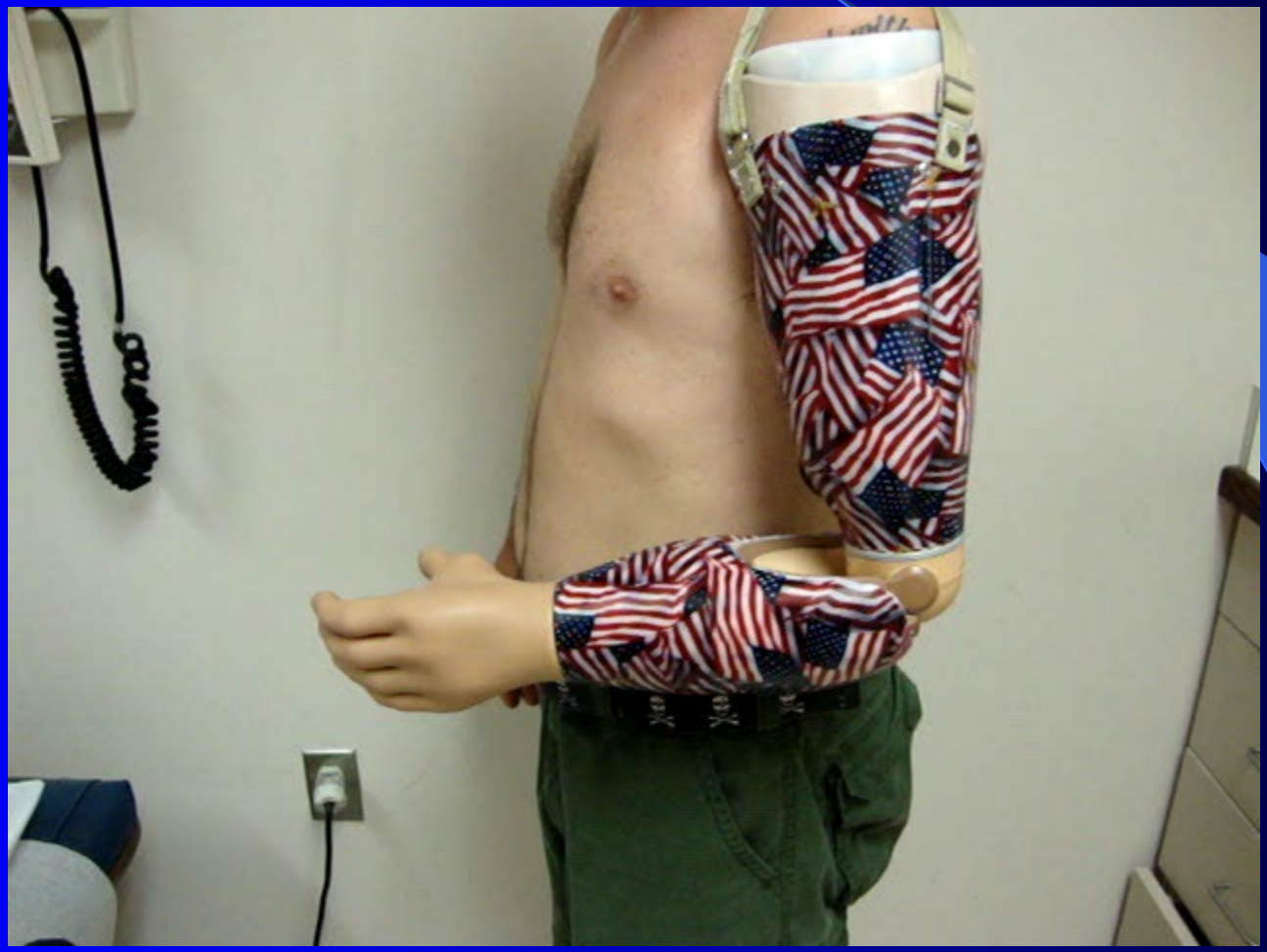
Bilateral trans-radial amp with cable control

Bilateral trans-radial amp with myo-electric control

Bilateral trans-radial amp with test sockets

Training with unilateral trans-humeral prosthesis

Training with unilateral trans-humeral prosthesis




ARBOR 4
Hanger

THANK YOU