A photograph of a person in a blue kayak on a body of water. The kayak has 'EDF' and 'NELO' logos. The person is wearing a white shirt and a life vest. In the background, there is a wooden dock with several cars parked on it, and a grassy hill with trees. The water is blue and calm. The title text is overlaid in yellow.

# Adaptations and Integration of Paddlers with Disabilities at Canoe Clubs

12/08/2009

Romain DIDIO / Cyril FOURNIER  
FRANCE



# 1- ADAPTATIONS

- >Special seats
- > Back rest for everyone proposed by the boat manufacturers
- >Adaptations « do it yourself »
- > Amputee adaptations
- > Upper limbs adaptations
- > Floats
- > Fitting out dock facilities

# 2- PATHOLOGIES : DESCRIPTIONS AND PRECAUTIONS

# 3- IMPORTANT TOPICS

- > Precautions that should be taken
- > Integration at the club
- > Recommendations for events

# Why do we need to adapt the equipment?

- Comfort (facility)
- Security (for the paddler and the coach)
- Transmission
- Performance
- Integration

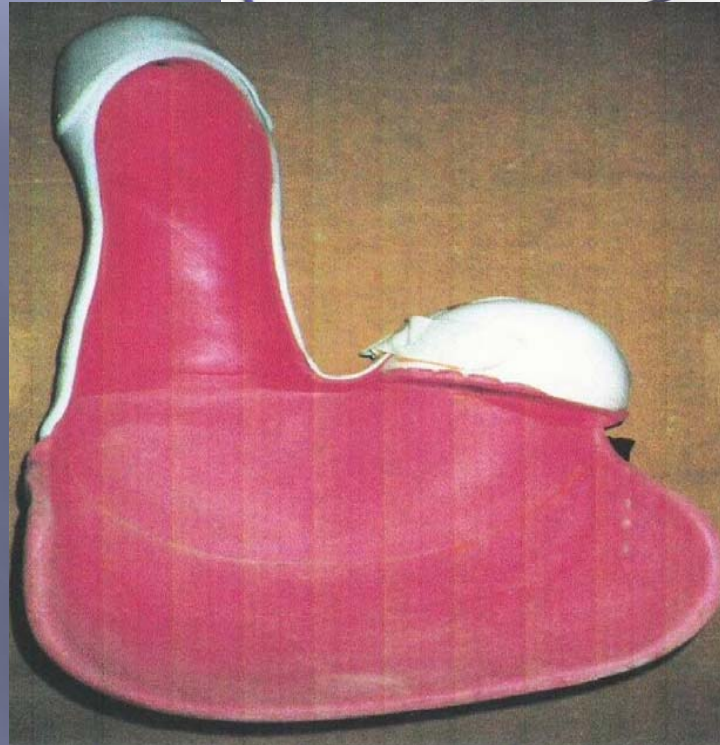


## ADAPTATIONS : special seats





Adjustable seats



**Seat for amputee kayakers**

Seats designed by a  
prosthetist



Pelvic abutment is very important for  
strength transmission and balance of  
the paddler





## Personalised seat design by a prosthetist



**Legs are resting on a long surface. Inclination of the seat toward the back is important to prevent spastic crisis**

USA Seats: <http://www.creatingability.com/>





# Back rest for everyone proposed by boat manufacturers

<http://www.dag-kayak.com/>



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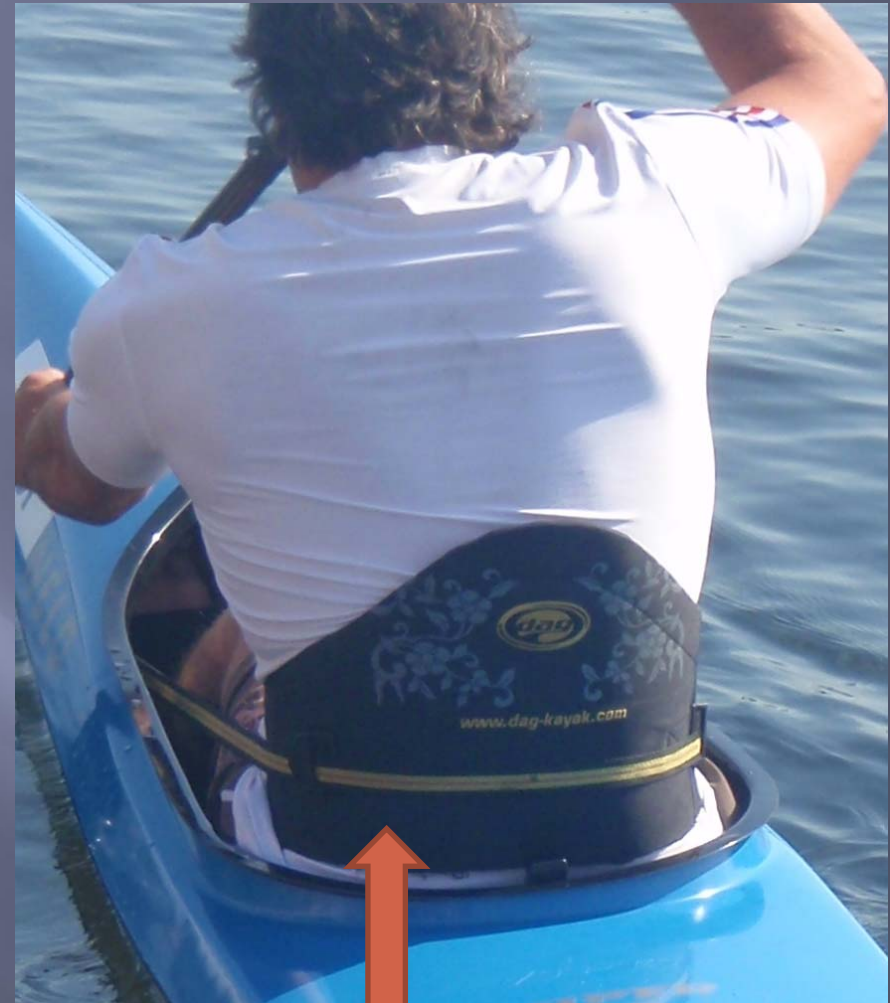




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**Lumbar support for strength transmission and to compensate for lack of sheathing**



# ADAPTATIONS

« do it yourself »





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## Adaptation for amputees







Use of a  
rudder by  
amputated  
leg

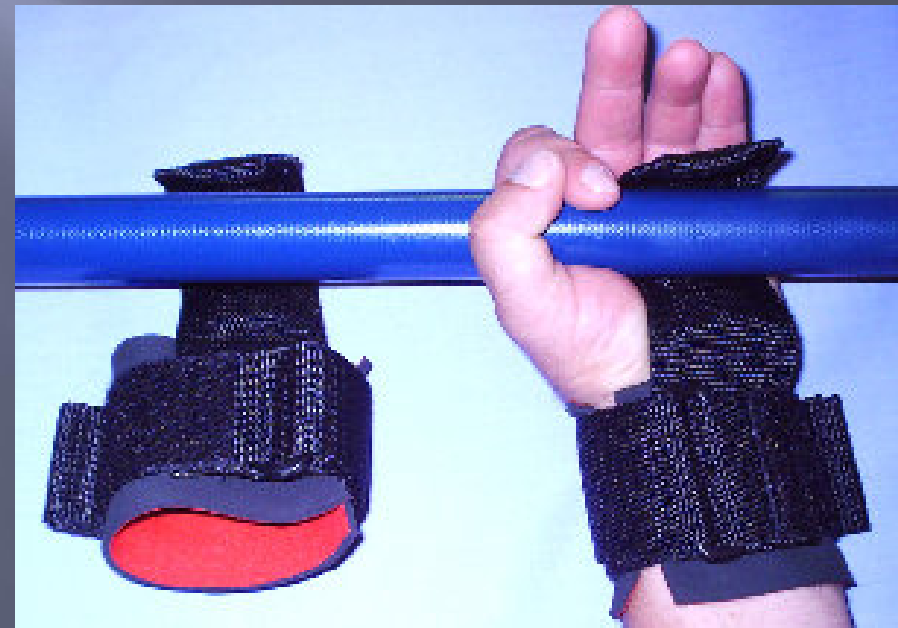


Locking of an amputated leg is a must for balance, comfort, and strength transmission.





# Upper limbs adaptation





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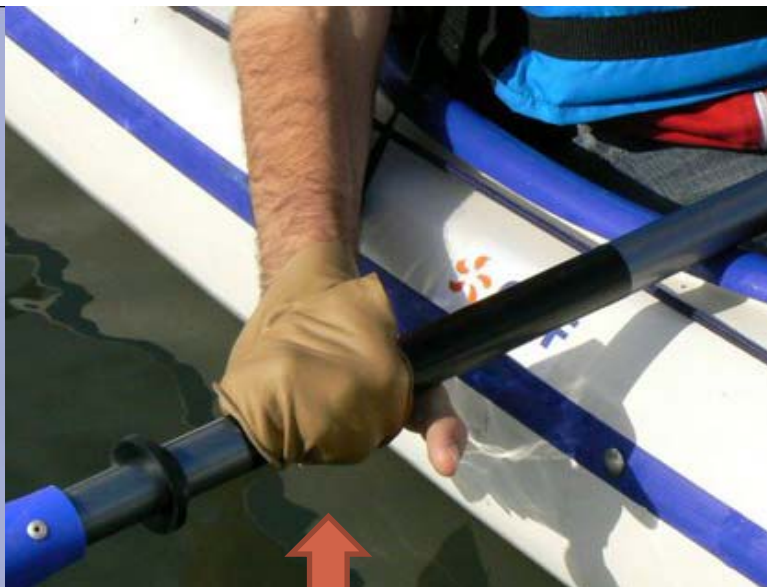


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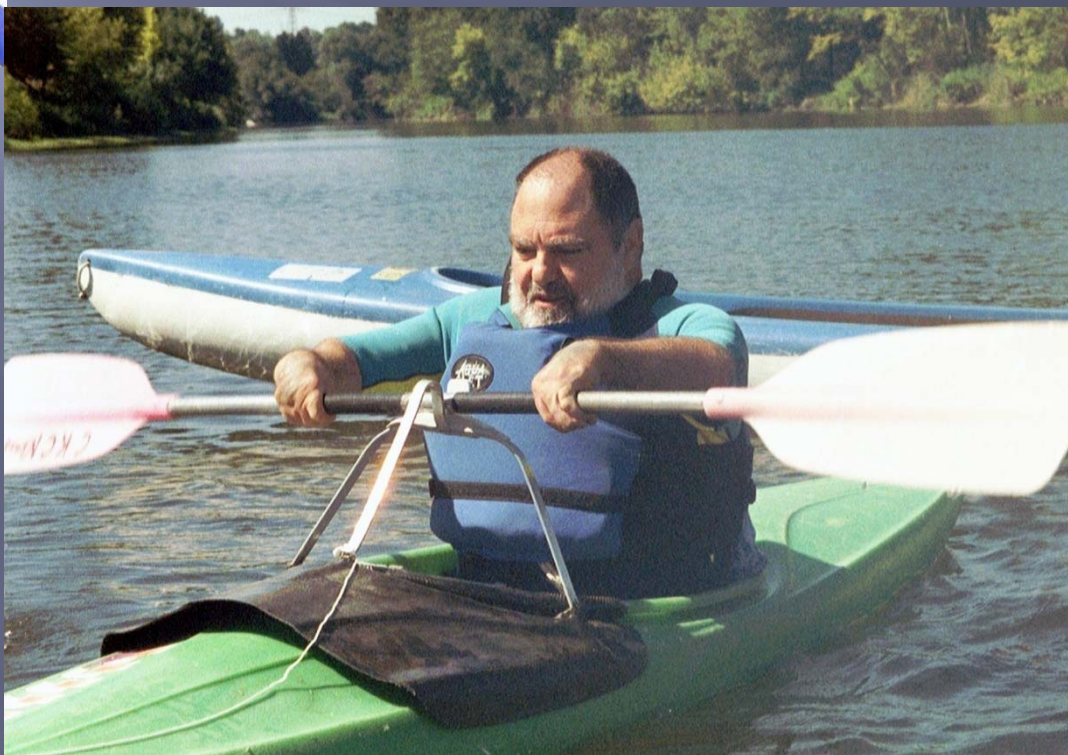
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Muff to maintain the hand  
on the paddle





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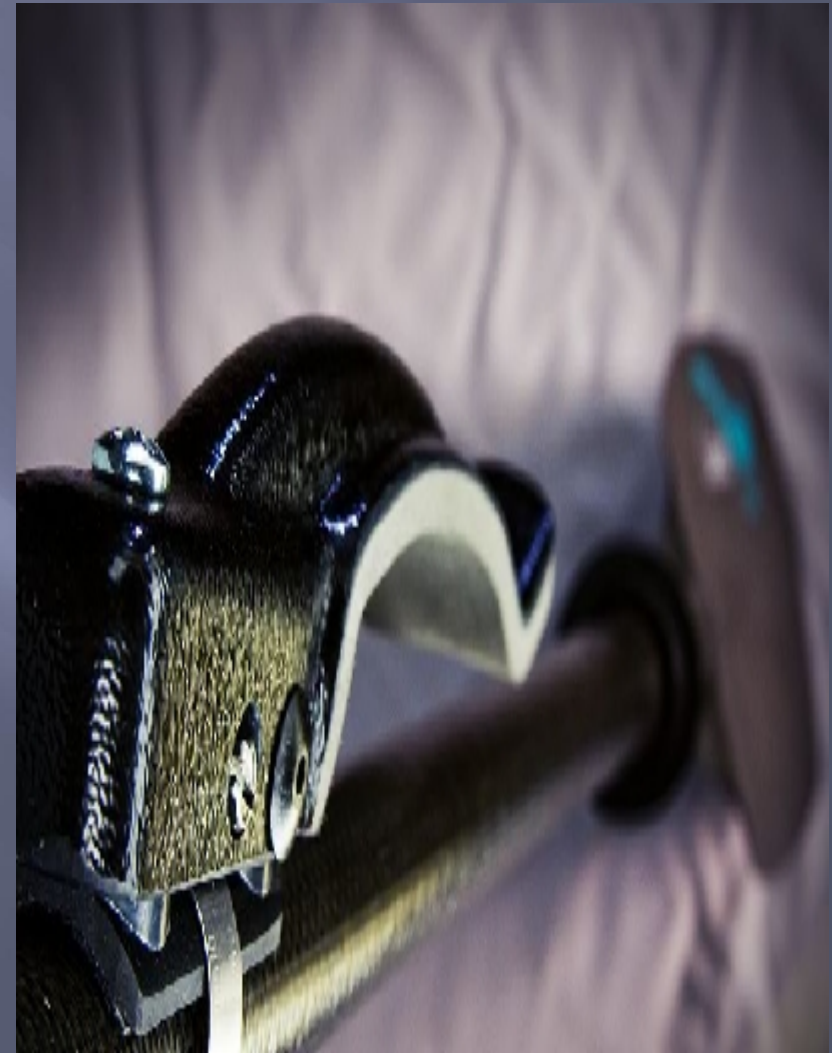


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Help to maintain good prehension: <http://www.creatingability.com/>



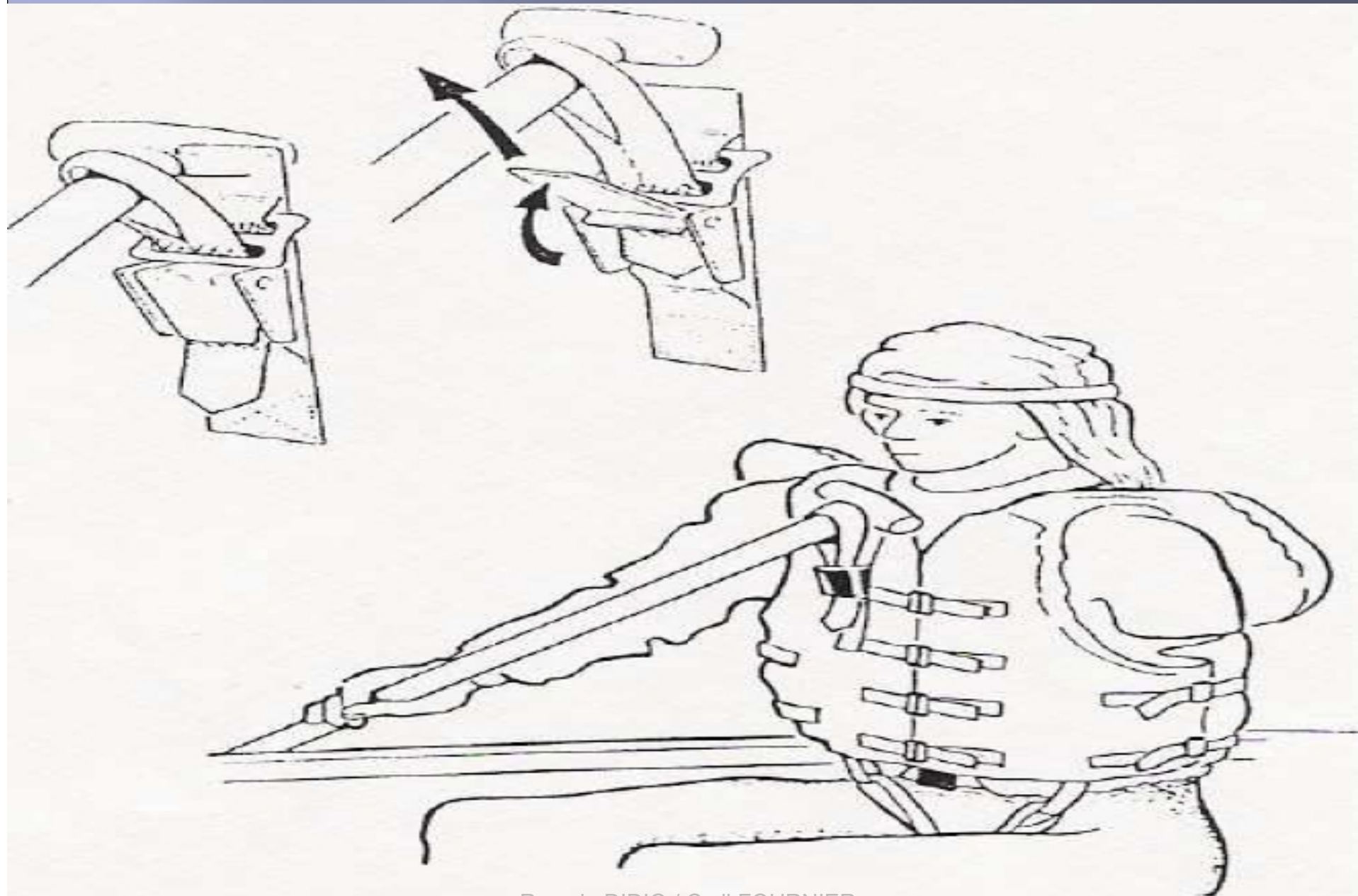


## Paddle with only one arm









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Clip the paddle to use only one arm





The floats: <http://www.creatingability.com/>





Inflatable floats



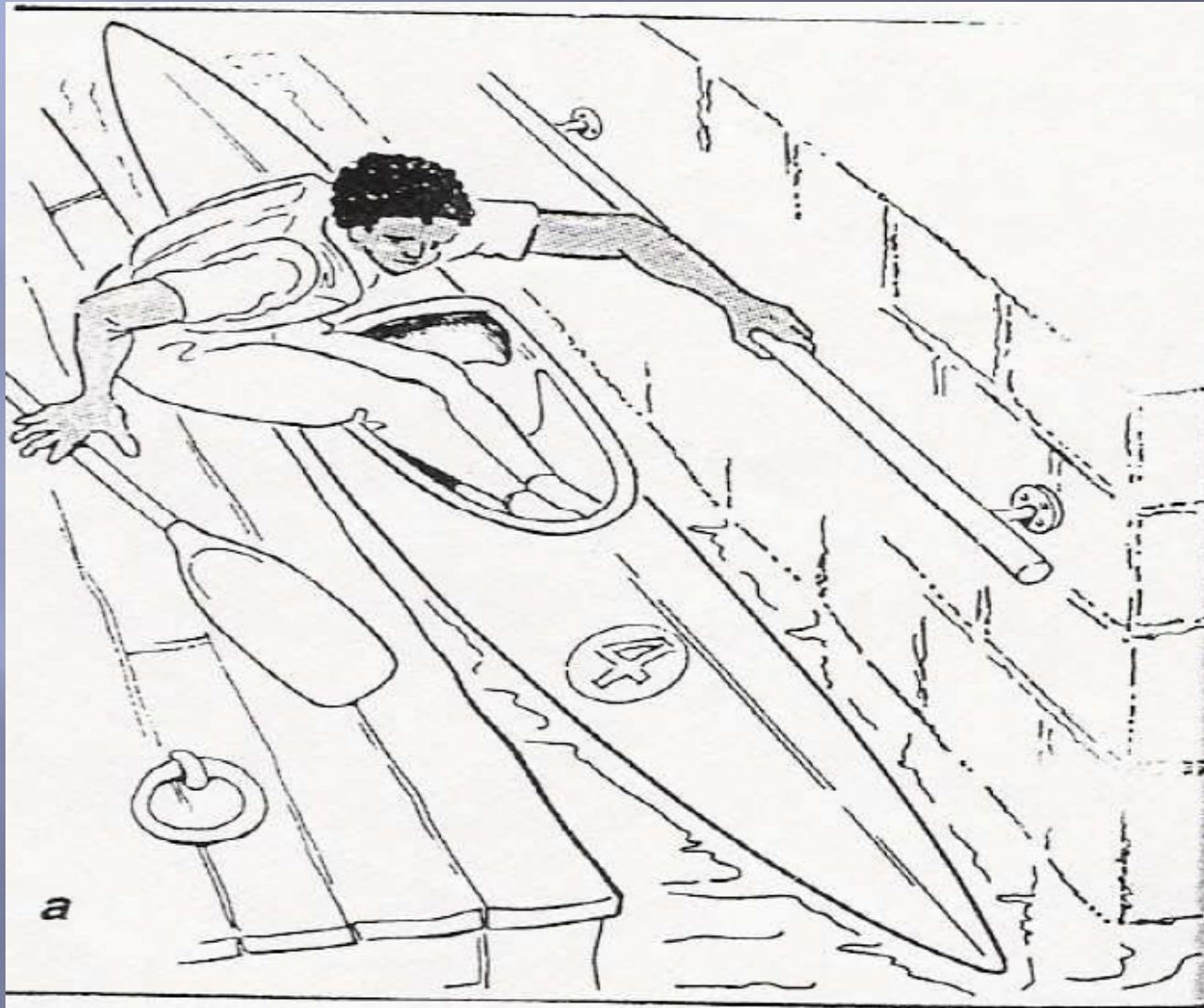


# Accessibility to water

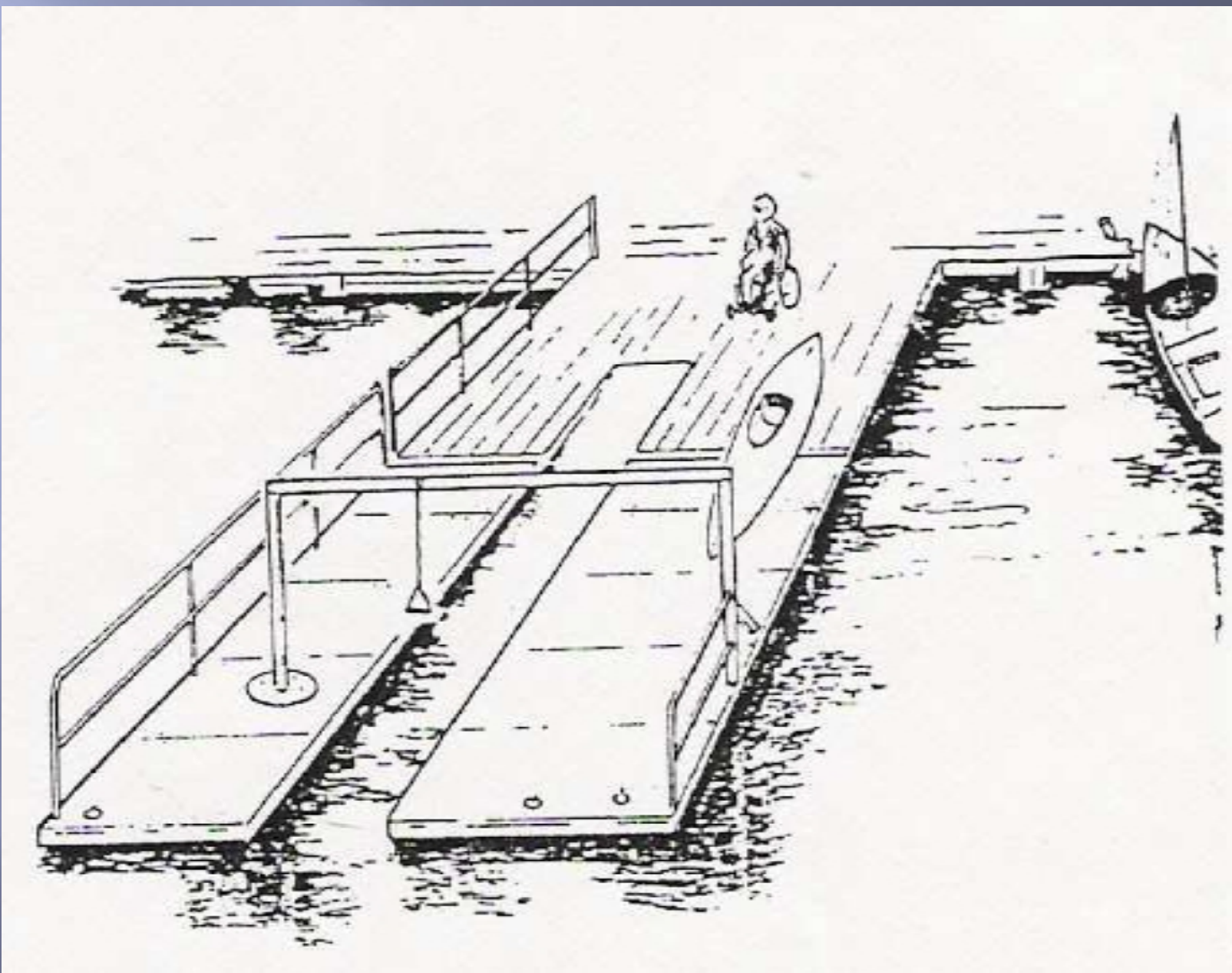


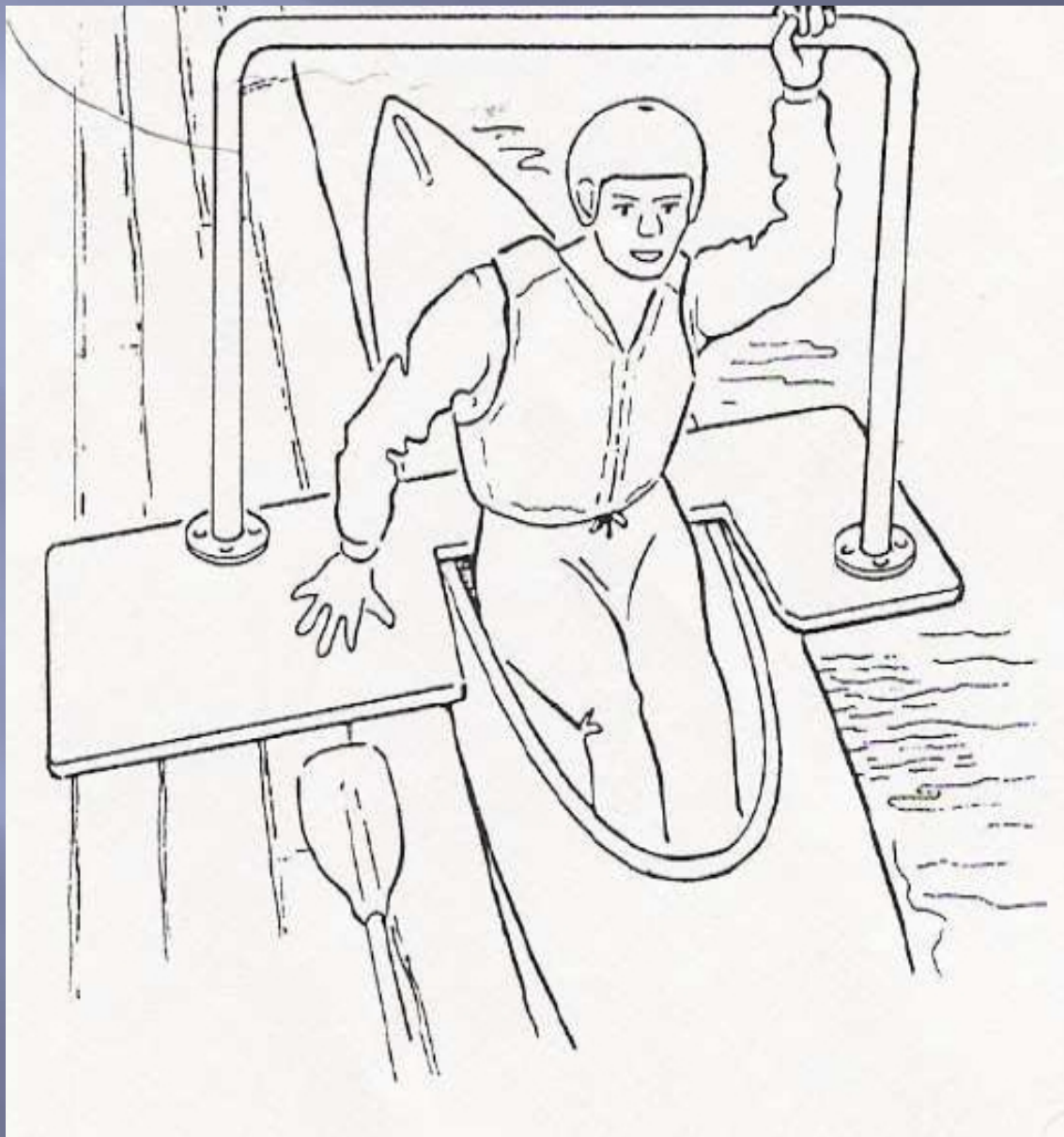
Beach Hippocampe: [www.vipamat.fr](http://www.vipamat.fr)

# Loading adjustments









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## 2- PATHOLOGIES

### a. Motors

⇒ Chair:

- electrical

- manual

} para/quadra, CP, TC, evolutive (myopathies...)

⇒ Walker:

- Amputees LL/UL, hemiplegics, CP, para/quadra incomplete, others

### b. Visual deficiencies

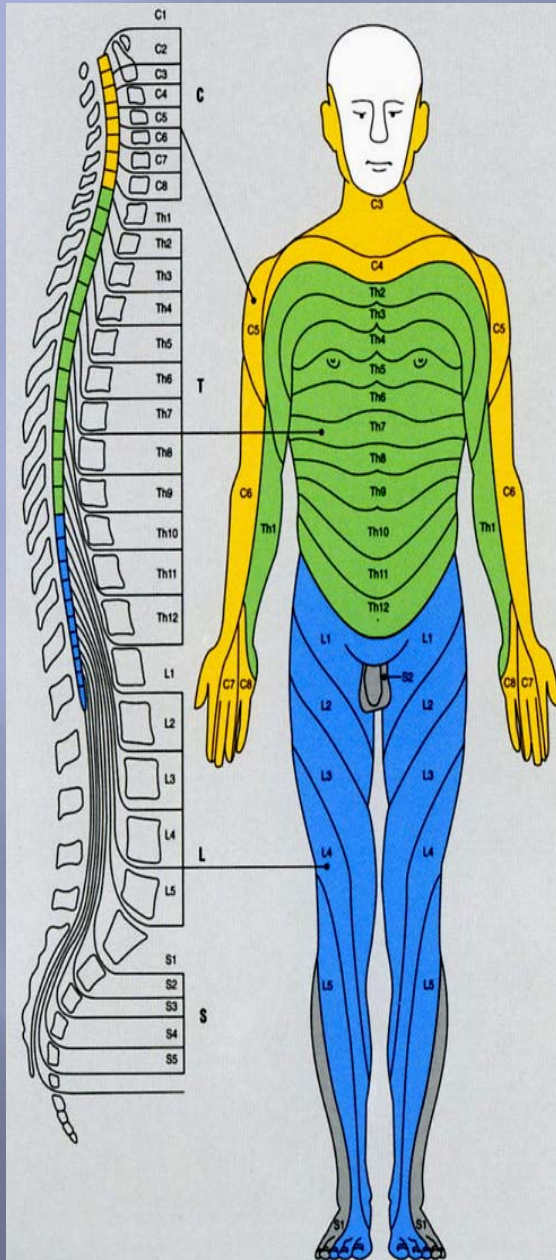
=> total

=> partial

### c. Auditory deficiencies

=> total

=> partial



## □ *Paraplegic and quadriplegic:*

### **METAMERIC SENSITIVE LEVEL:**

- Which one?
- Complete or incomplete ?
- Functional consequences?

### **SPASTIC PARAPLEGIA:**

spasms, hypertonia, uncontrolled reflex of defence.

### **SPINELESS PARAPLEGIA:**

Weak muscles, amyotrophie, no osteo-tendinal reflexes.



## □ **Paraplegic and quadriplegic:**

Peripheral neurologic handicaps

### NEUROLOGICAL LEVEL

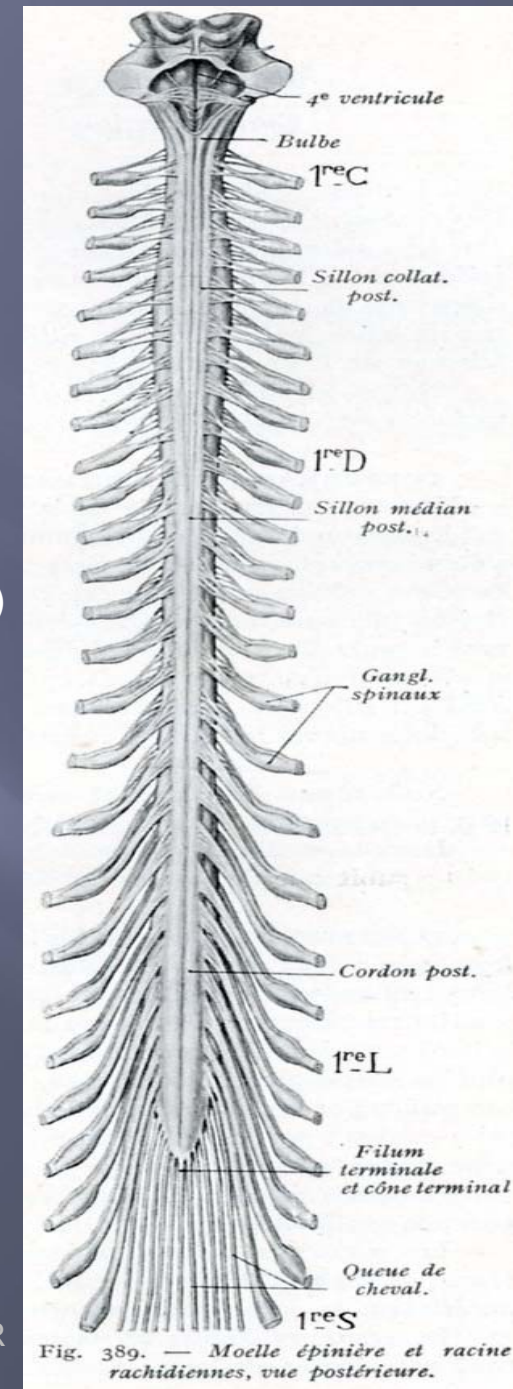
- Numbering = spinal column nerve ≠ vertebra
- C5 to T1 = quadriplegic
- Under T2 = paraplegic

### IN RELATIONSHIP WITH VERTEBRA ( IN GENERAL)

- Cervical = quadri
- Dorsal = para high
- Lumbar = para low
- "Cauda equina" = para low

**Paraplegic:** palsy of the lower limbs,  
Coming up more or less high at the trunk level  
(according to the affected nerves)

**quadriplegic:** affection going up to the upper  
limbs



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❑ *Paraplegic and quadriplegic:*

COMPLICATIONS and PREVENTION :

- ✓ Vesico-sphincter troubles
- ✓ Vegetative troubles
- ✓ Skin complications
- ✓ Osteo-tendinal complications
- ✓ Spasticity increase





## ❑ *Paraplegic and quadriplegic:*

### CONCLUSION PARA/QUADRI :

- Variable portrait
- Ask athlete information on their handicaps
- Rare specific complications in the practice of a sport
- Main prevention (fatigue, tendinitis, spasms...)

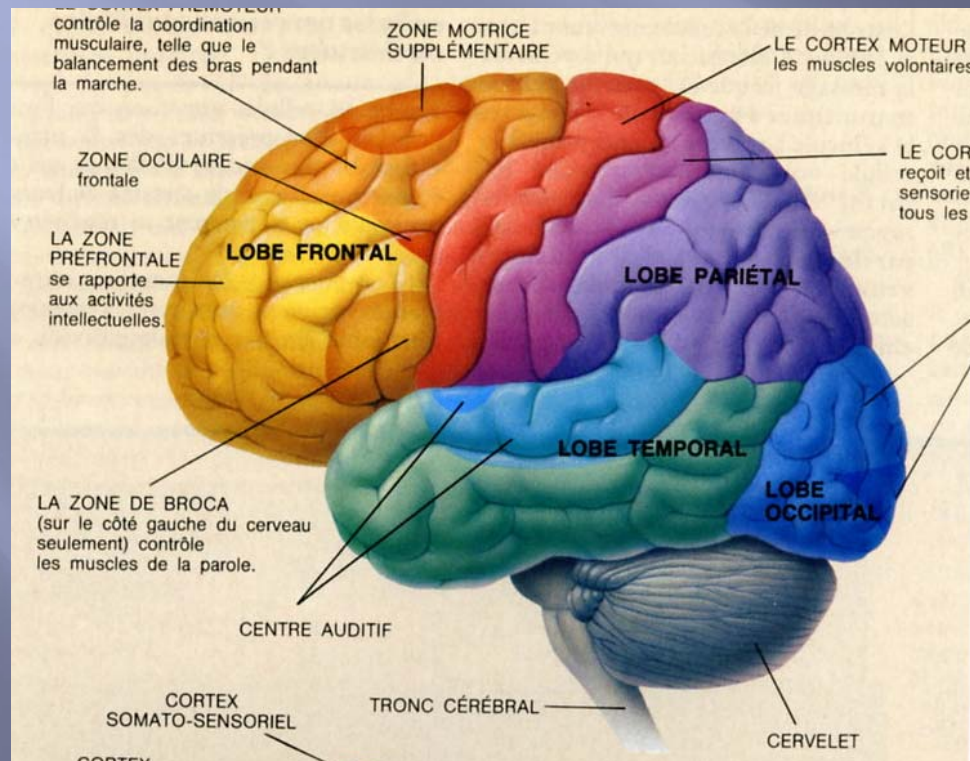


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## ❑ *Hemiplegic : Palsy on one side of the body*

Encephalic lesion of the frontal lobe or of the connected neuron

Damage hemisphere on the side opposed to the hemiplegic



### AETIOLOGY :

- crane trauma
- ACV
- tumours
- infections
- malformations
- diving accident
- Cerebral Palsy (CP)



## □ *Hemiplegic :*

### HEMIPLEGIC MAIN CHARACTERISTICS :

- Right or left
- Complete or incomplete
- Frequent brachium-facial predominance
- Spasticity
- Frequent associated troubles:
  - sensitive troubles
  - visual troubles
  - language troubles
  - epilepsy

### CRANE TRAUMA:

- Neuropsychological
- Epilepsy
- Balance troubles
- Orthopaedic troubles



## CP (Cerebral Palsy):

- Causes: cerebral suffering ante/during/ or post-natal ; premature (in general : lack of oxygen at birth: late breathing)
- Non hereditary, non evolutive
- Associated troubles:
  - hypertonia
  - abnormal movements
  - disturbed motor pattern
  - visual and auditory troubles
  - spatiotemporal troubles
  - epilepsy
  - orthopaedic troubles
  - different intellectual disease (1/3 of the cases)





## □ **Amputees:**

- Aetiology : congenital, traumatic, tumoral
- Lower limb(s), upper limb(s), poly-amputees
- Improvement of the equipment
- Problems at the stump(important hygiene)
- Sport activity with or without equipment depending on the sport
- Possible complications due to friction humidity, salted water...



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## ❑ *Evolutionary neurologic handicap :*

- Myopathy (Duchenne de Boulogne, Becker,...)
  - breathing assistance
  - orthopaedic problem
  - heart condition
- Heredo-degeneracy spino-cervical (Friedreich, Charcot-Marie...)
- Spinal amyotrophy ...

## **Evolutionary handicap problems:**

- Aggravation with fatigue
- Aggravation with settled way of life
- Make compromise between physical activity and rest
- Medico-technical assistance often needed
- Sophistication of equipment
- Psychological and social benefits play an important part
- Do not propose long term objectives



## ❑ *Visual deficiencies:*

- Aetiology : congenital, traumatic, tumoral
- Precautions :
  - frequent evolution of injuries
  - fragility of eyeballs = avoid traumatism
  - frequency of falls and collisions
  - watch water splashing depending on the cases.



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## ❑ *Auditory deficiencies :*

### - Aetiology:

- chronic otitis
  - cerumen plug
  - otosclerosis
  - otospongiosis: calcification that reduce mobility of the stirrup
- } deafness of transmission  
(extern and mid ear, never total)
- exposure to loud noises
  - absorption of ear's toxic medication
  - skull fractured
- } deafness of perception  
(intern ear)

### - Precautions :

- consider removal of auditory prosthesis
- watch impacts at the implant level



### 3 – IMPORTANT SUBJECTS

- \* Discuss with the paddler:  
his/her pathology, his/her true-life sport,  
what he/she is looking for from sport activity.
- \* The medical certificate and record of medical information  
(Abdos yes/no, level of fatigue, etc....)
- \* Importance of tipping (Remember, this can be fun!)
- \* Watch for skin problems
- \* Watch the weather (warm/cold) => problems of  
thermoregulation (paraplegic et quadriplegic)

- \* Assess aspects related to possible incontinence: time on the water, bottle, catheter....
- \* Assisting the transfer into the boat... watch for the safety of the person and the one who is assisting.
- \* Safety of adaptations: there should be no risk of jamming in case of wet exit (tip).
- Comfort and tipping : experiment with tipping, validation of tipping and of adaptations is common: discussion helper/paddler =>very important.
- Review all steps of the apprenticeship: wet exit, reloading, safety, choice of equipment...



# IMPORTANT SUBJECTS AT THE CLUB LEVEL

- Be Welcoming: ensure the Club environment is accessible to everyone.
- Promote and communicate with other Club members
- Review the accessibility of the Club environment.
- Communicate with the participant: speak directly to the one involved.
- Promote long term participation adapted to the desire, capacity and pathology of the participants.
- Do not hesitate to call on local expert resources
- Opportunity for the Club to “give back to the community”

# RECOMMENDATIONS FOR COMPETITIONS

- Appoint a person on the Organising Committee in order to coordinate all matters pertaining to the PaddleAbility races & all accessibility issues.
- Parking spaces for persons with a disability should be convenient.
- All access routes from the parking to accommodation, from accommodation to the regatta venue be accessible. This means a smooth access route which facilitates movement in a wheel-chair or crutches.
- Ensure accessible washroom facilities .
- A special loading area (the docks) is required (loading is longer and need more space due to wheel-chair).



- The height of the loading dock at between 15 and 20 cm from the surface of the water with a minimum width of 1.50 m.
- If there is a ramp to access the dock, the width should not be less than 1 m and the slope should be no more than 10 %. A guard/handrail should be provided on one side.
- Schedule the races to begin no sooner than 10 am (to give the athletes a chance to get ready)
- Provide an area to store the boats close to the dock.
- A tent, close to the loading area, to store the garments and above all, the wheel-chairs, the crutches and the prosthesis...
- Provide a tent and related facilities/equipment for a PaddleAbility athlete classification team

# CONCLUSION:

## BENEFITS OF PRACTICING CANOE/KAYAK FOR DISABLED PERSONS

### Physical aspects

- Rediscovery of one's personal ability (feel one's own body under effort...)
  - Facilitate the use of muscular and functional compensations
  - Keeping and improving heart and breathing capacity
  - Balance development
  - Skill development
- Etc...

### Socio-psychological aspects

- Social integration into the life of the club
  - Feeling of being like all other persons on the water
  - Outdoor activity
  - Feeling of liberty (equipment non visible or absent)
- Etc...

=> IMPROVEMENT OF AUTONOMY AND SELF ESTEEM