Propulsion in Wheelchair Basketball

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Wheelchair basketball

- Various disabilities
- Classification is functional
- Classes from 1 to 4.5
- 14 points on the court at one time
- Chair custom to individual player. Height of chair back, straps, dump in chair, wheel position
- Wheels camber (angle) and size
Comparison of Push

1 point versus 4 point player

1 point player
T6 complete

4 point player
Above knee amputee

Rods in thoracic and lumbar
What It Takes To Win (WITTW)

Shooting

Speed and Chair Skills

Defensive Fundamentals | 1st Place | Tactics and Game Sense
2nd Place | 1st Place | Passing and Ball Handling
3rd Place
Speed and Chair Skills

Why is it important?

• Improves relationship with the ball (passing, shooting, rebounding, defending, attacking)

What are we focusing on?

• Initial Hand Position (Ready Phase)
• Optimal Pushing Technique (Push Phase)
• Finishing Hand Position (Push and Recovery Phase)
• Hand Recovery Speed (Recovery Phase)
Optimal Management Of The Paralympic Shoulder

Ready Phase

Optimal Management Of The Paralympic Shoulder

Push Phase

Fig. 2. Definition of forces (N) in wheelchair propulsion. $F_r$ = radial component of $F_{tot}$; $F_t$ = tangential component of $F_{tot}$; $F_{tot}$ = total force; $F_x$, $F_y$, $F_z$ = global reference frame; $M_{wrist}$ = wrist torque (Nm); $M_{hub}$ = hub torque (Nm); $\phi$ = point of force application referenced with respect to the horizontal ($^\circ$).

Recovery Phase

Basic overview of Muscles

Push phase
- Anterior deltoid, pectoralis major, infraspinatous
- Pectoralis major and infraspinatous involved in stabilisation on the joint but subject to fatigue. Teres minor and subscapularis may increase
- Biceps and long head of triceps
- Latissimus dorsi and subscapularis for reposition in recovery

Stop
- Elbow flexors and extensors
- Shoulder flexion and extensors – Latsissimus dorsi, triceps
- Rhomboids lower traps
- Use of abdominal

Turn
- Each shoulder working in opposite direction
Considerations on Demand of Shoulder

- Eccentric, Concentric and Isometric Use of Muscles
- Repetitive Action
- Disability - use of abdominals, hip function, contractures.
- Technique
- Chair design
Shoulder Issues

Sophie Carrigall – 1 point player
• Shoulder subdeltoid bursitus
• Biomechanical issues with chair, scapula control lack of abs and hip flexor contracture

Amy Conroy – 4 point player
• Shoulder pain – tight thoracic spine, elbow flexors and weak abdominals, stiff radio ulnar joint
Take Home Points

• Wheelchair basketball propulsion significantly different within different classes.
• Wheelchair basketball has the challenge of start, stop and turning for demands on the shoulder.
• Shoulder issues linked to significant weakness, stability, stiffness in other parts of the body.
• Further research needed that is specific to Wheelchair basketball propulsion and also looking at stopping and turning.
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