

Acceleration and Velocity in Speed Skating

Possible transfers to Ice Hockey

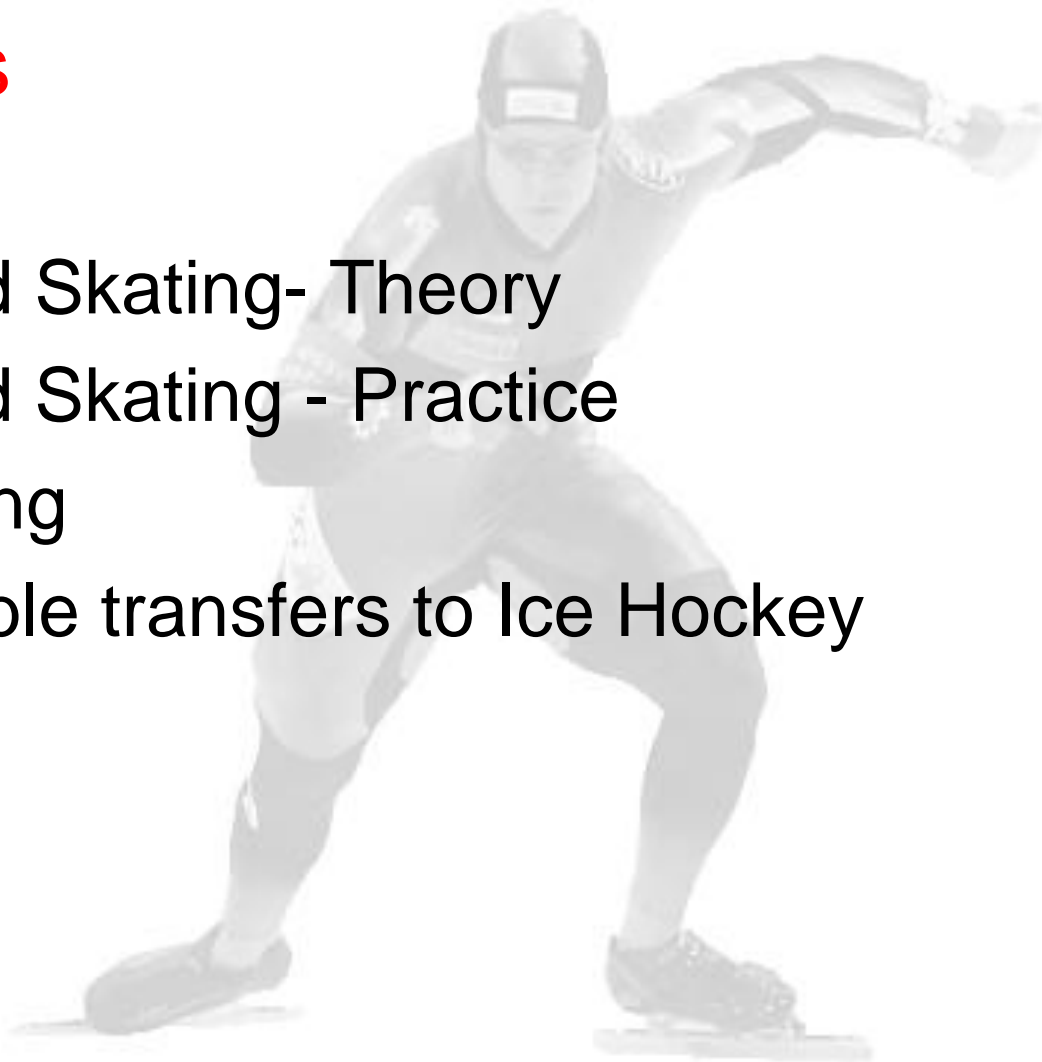


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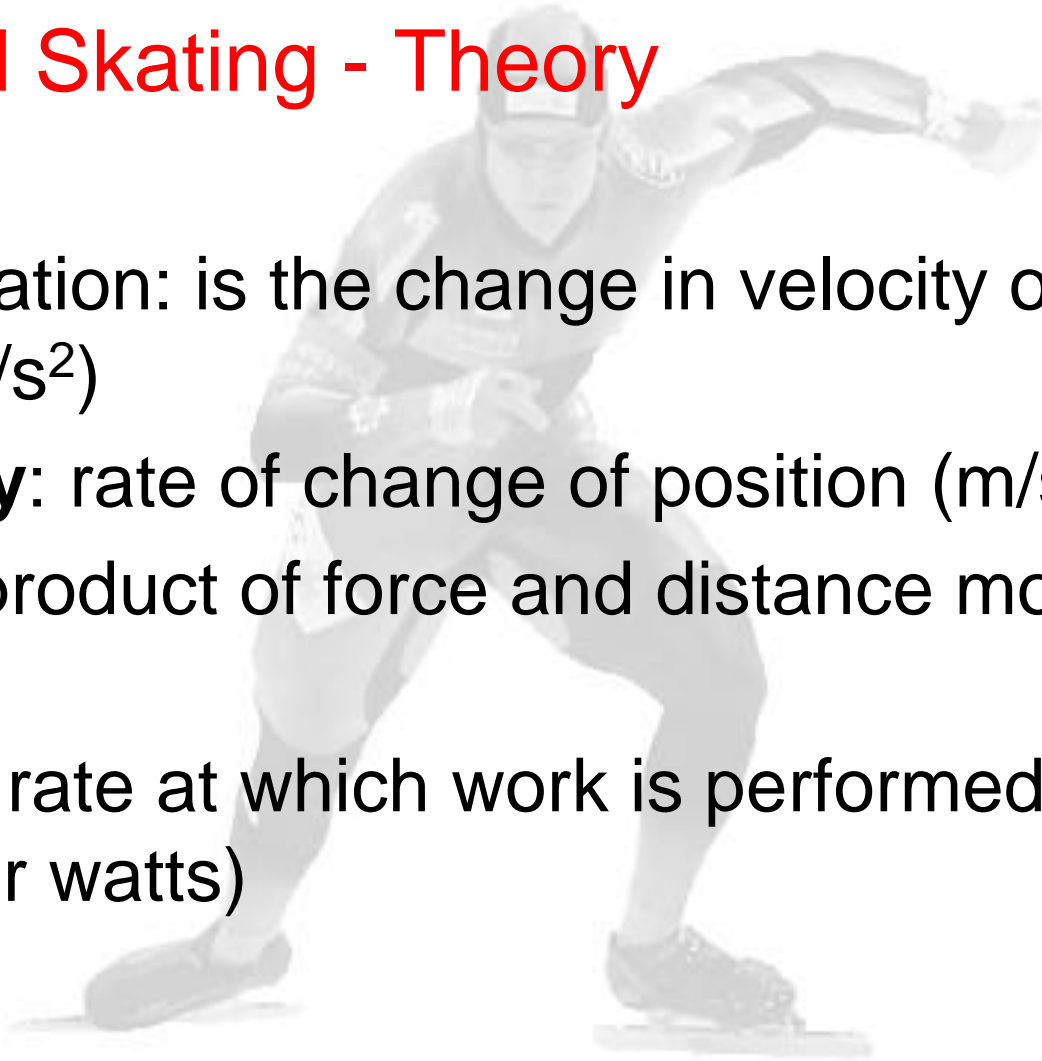
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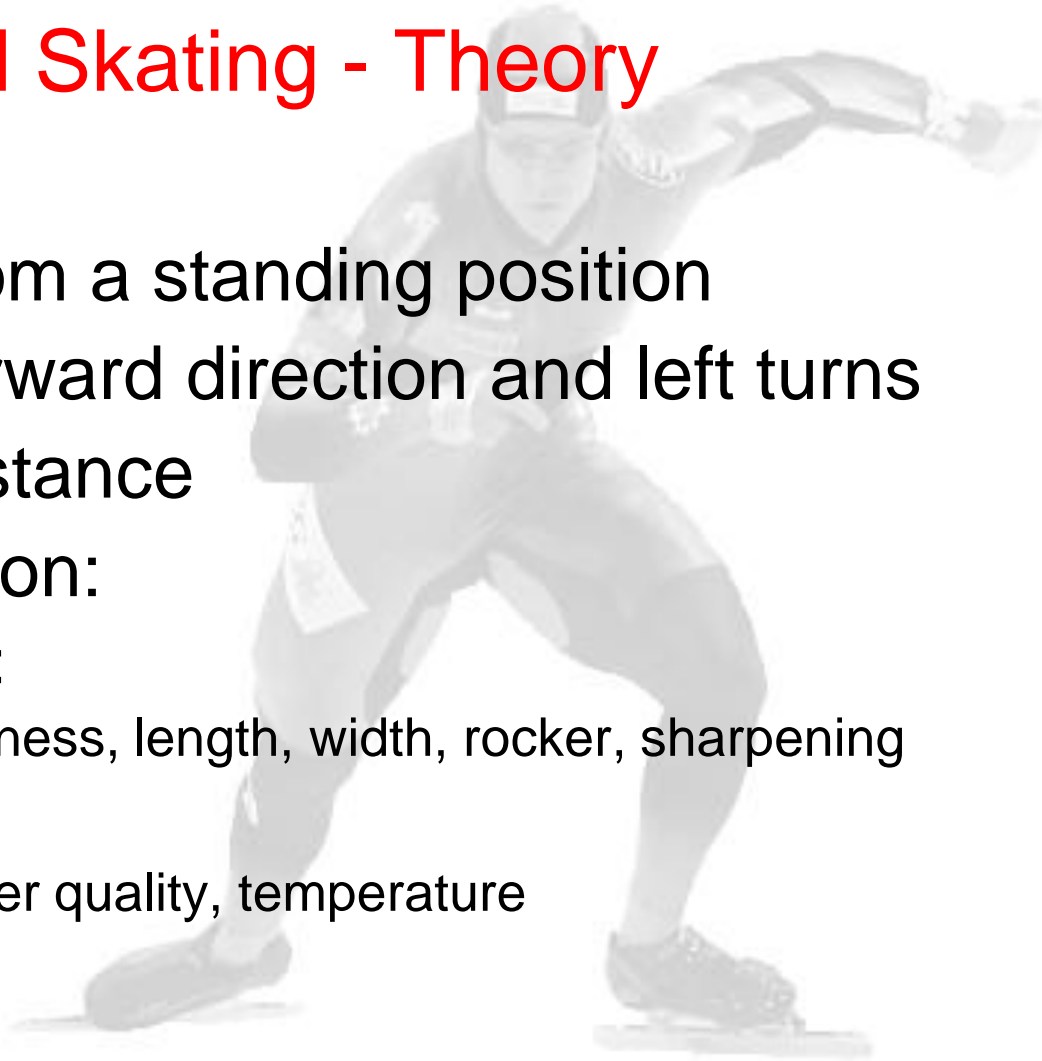
1. Speed Skating - Theory

- **Acceleration:** is the change in velocity over time (m/s^2)
- **Velocity:** rate of change of position (m/s)
- **Work:** product of force and distance moved (Nm)
- **Power:** rate at which work is performed (Nm/s or watts)



1. Speed Skating - Theory

- Start from a standing position
- Only forward direction and left turns
- Air resistance
- Ice friction:
 - Blade:
 - stiffness, length, width, rocker, sharpening
 - Ice:
 - water quality, temperature



2. Speed Skating - Practice

- Work =

Force

X

Distance

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.



2. Speed Skating - Practice

- Power = work / time

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

2. Speed Skating - Practice Start and Acceleration



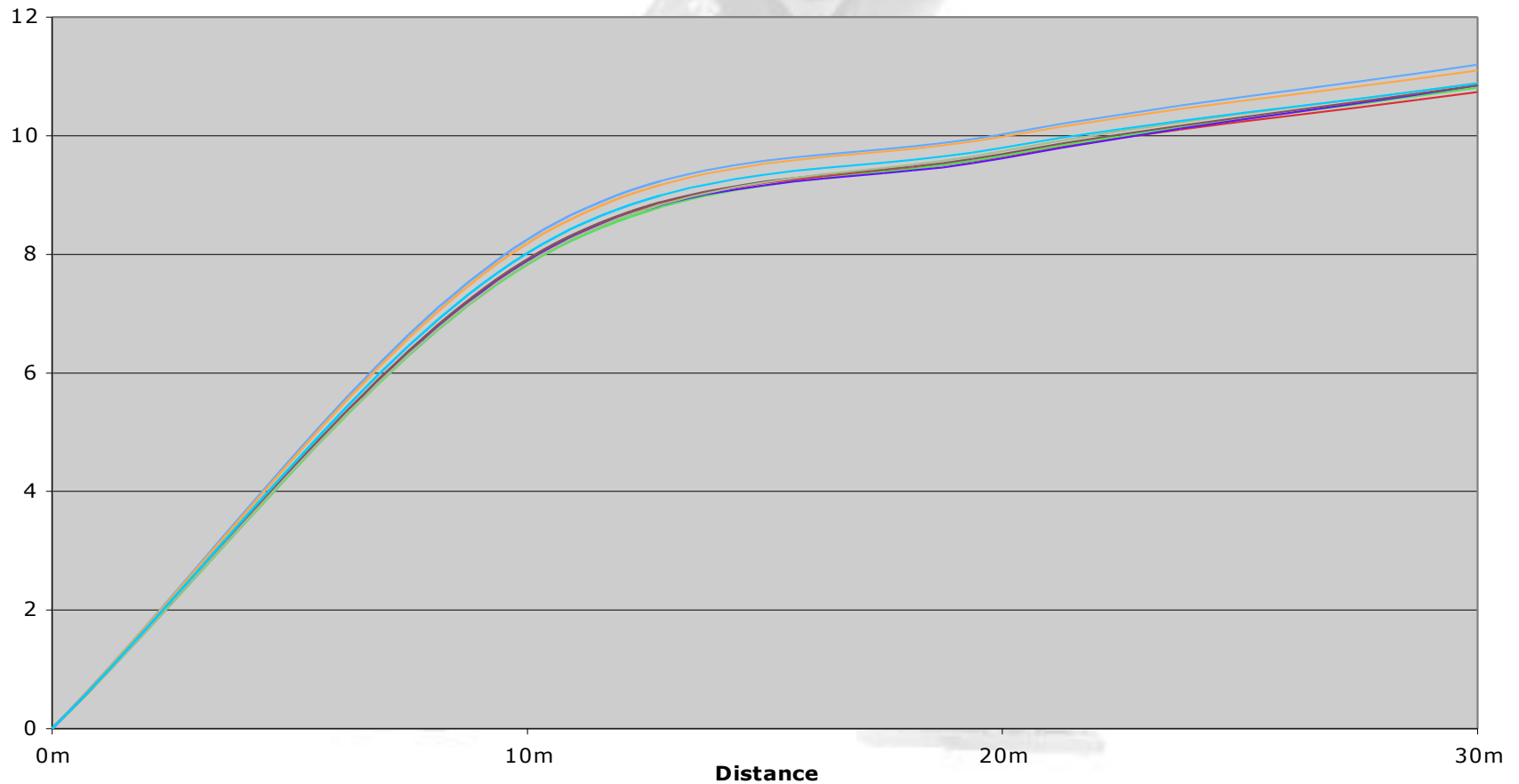
7 May 2010

Marion Wohlrab
Diplom Coach

2. Speed Skating - Practice

Measure velocity at specific distance to gain insight in acceleration

Acceleration 30m Men

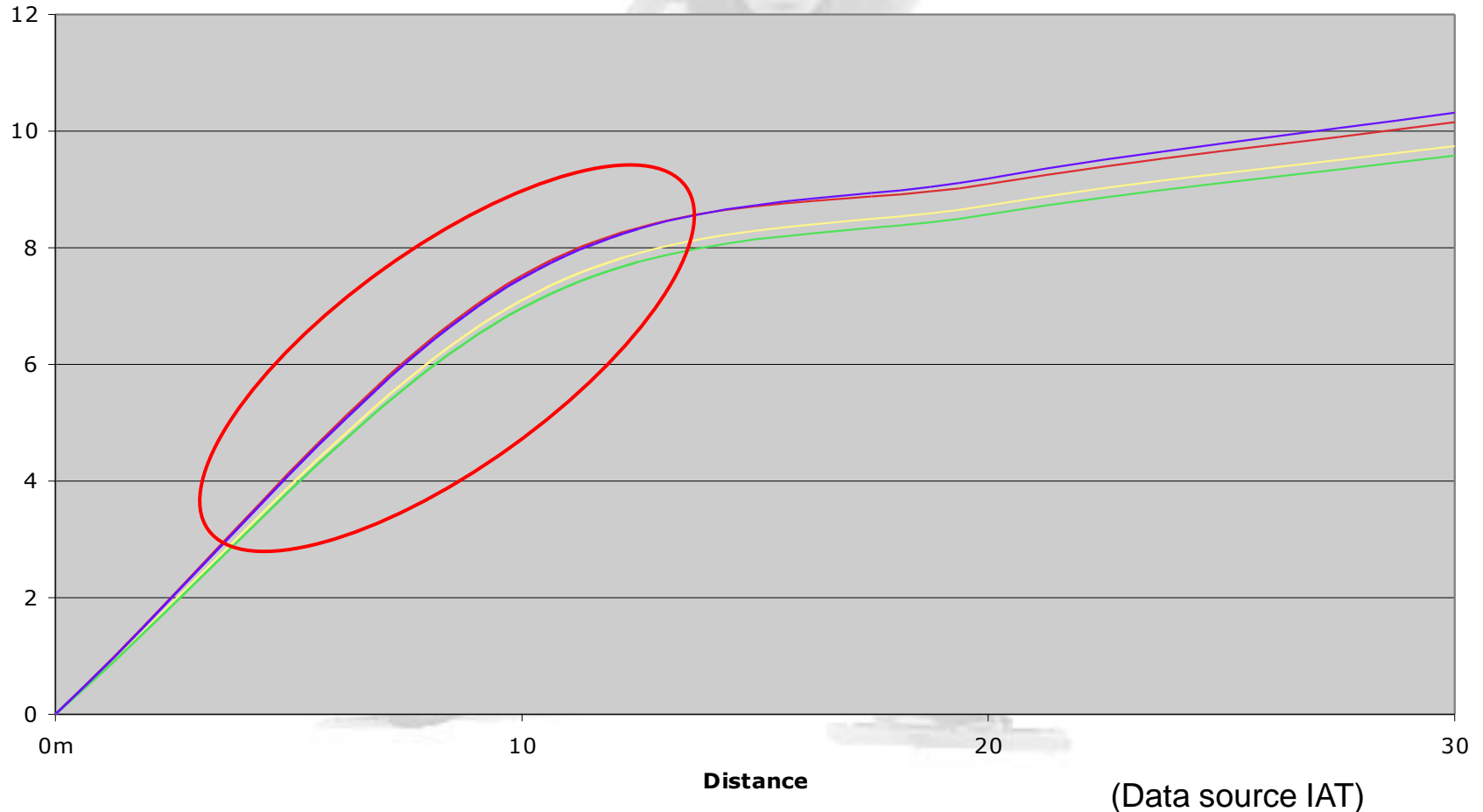


(Data source IAT)

2. Speed Skating - Practice

Measure velocity at specific distance to gain insight in acceleration

Acceleration 30 m Ladies



2. Speed Skating - Practice



QuickTime™ and a
Motion JPEG OpenDML decompressor
are needed to see this picture.

2. Speed Skating - Practice

QuickTime™ and a
Motion JPEG OpenDML decompressor
are needed to see this picture.

2. Speed Skating - Practice



initial push off



2nd push off



2. Speed Skating - Practice



landing



3rd push off



2. Speed Skating - Practice



4th push off

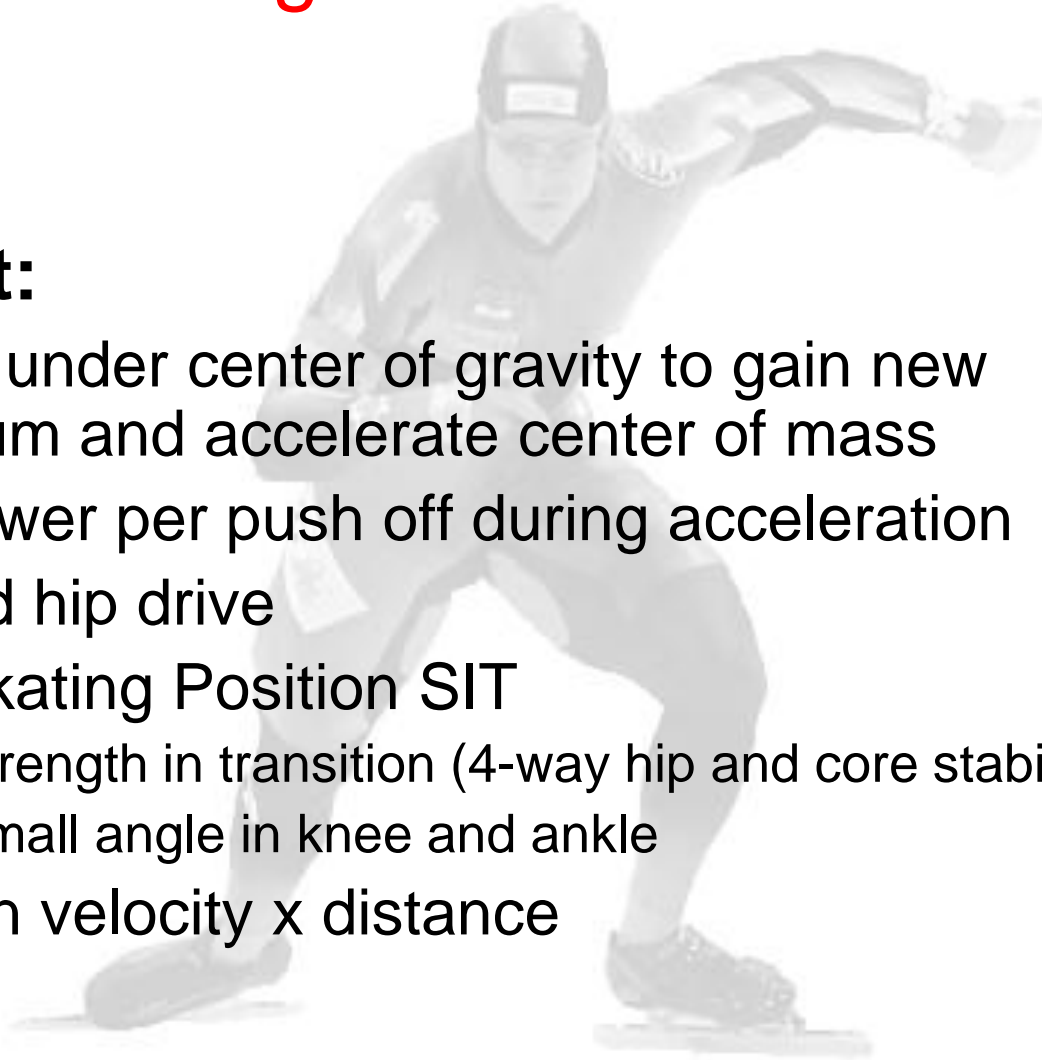
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2. Speed Skating - Practice

Important:

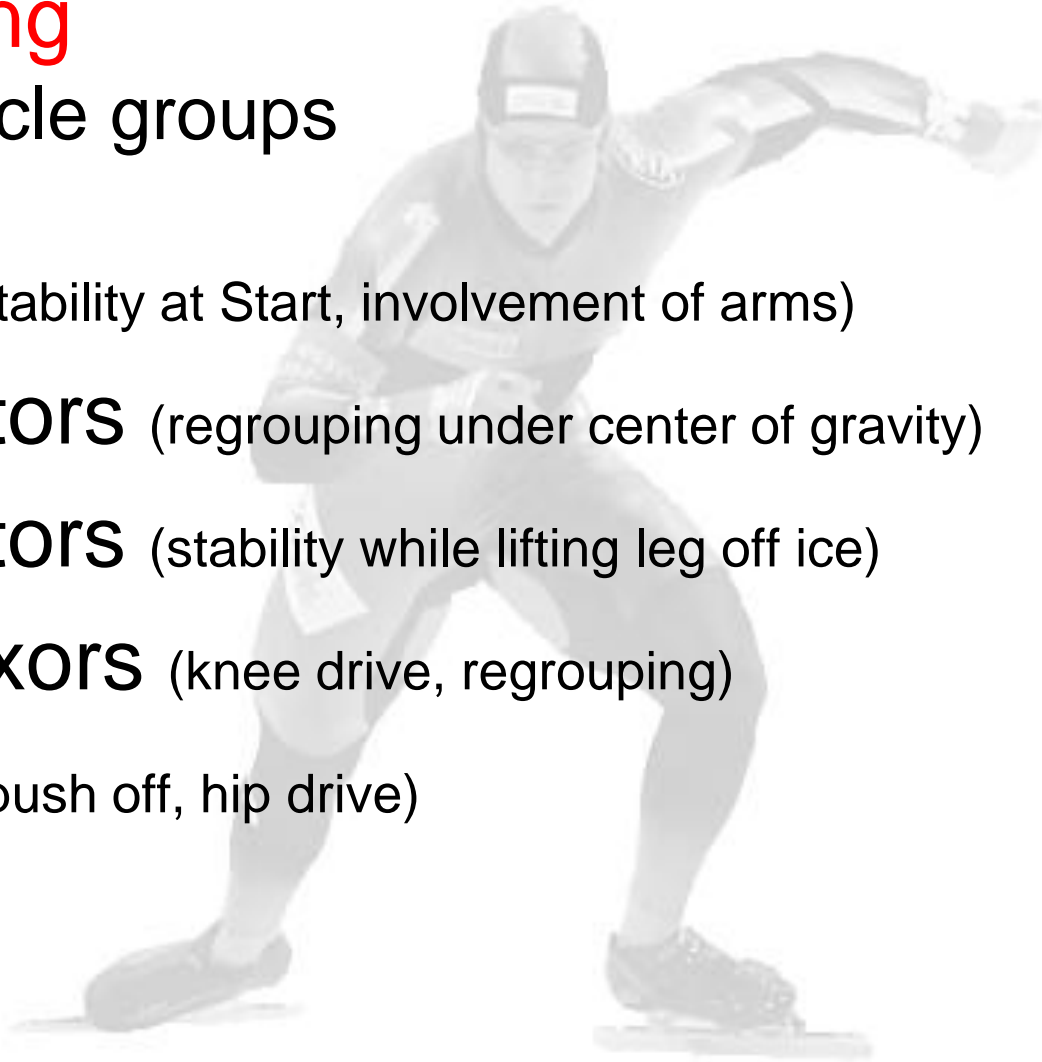
- Regroup under center of gravity to gain new momentum and accelerate center of mass
- 100% power per push off during acceleration
- Knee and hip drive
- Power Skating Position SIT
 - SIT - strength in transition (4-way hip and core stability)
 - SIT - small angle in knee and ankle
- Extension velocity x distance



3. Training

Main Muscle groups

- **Core** (stability at Start, involvement of arms)
- **Adductors** (regrouping under center of gravity)
- **Abductors** (stability while lifting leg off ice)
- **Hip flexors** (knee drive, regrouping)
- **Gluts** (push off, hip drive)



3. Training Exercises for Strength

Youth/Adult Speed

- Olympic lifts
 - (strength)
- Squats - one legged
 - (strength & balance)
- Resistance runs on/off ice
 - (strength & hip drive)
- Distance/Power oriented skating
 - (power per push off)
- Dryland
 - (strength)

Youth/Adult Hockey

- Olympic lifts
 - (strength)
- Squats - one legged + hockey stick + visual cues
 - (strength & balance & skill & body awareness)
- Resistance runs on/off ice
 - (strength & hip drive)
- Power oriented skating
 - (power per push off)
- Dryland w/wo stick
 - (strength)

3. Training Exercises for Strength

Kids Speed

- Olympic lifts
 - (technique & stability)
- Squats - one legged
 - (strength & balance)
- Resistance runs
 - (on/off ice) (strength&hip drive)
- Dryland/Imitation
 - (technique & strength)

Kids Hockey

- Olympic lifts
 - (technique & stability)
- Squats - one legged
 - (strength & balance)
- Resistance runs
 - (on/off ice) (strength&hip drive)
- Dryland/Imitation
 - (technique & strength)

3. Training

Exercises for Speed/Power

Youth/Adult Speed

- Over speed runs (on/off ice)
 - (nervous system & leg speed)
- Frequency oriented skating
 - (leg speed)
- Plyometrics SIT
 - (power)

Youth/Adult Hockey

- Over speed runs (on/off ice)
 - (nervous system & leg speed)
- Frequency oriented skating w/ change of direction
 - (leg speed)
- Plyometrics w/ upper body involvement, w/ spin
 - (power & balance & orientation)

3. Training

Exercises for Speed/Power

Kids Speed

- Frequency oriented skating
 - (leg speed)
- Plyometrics SIT
 - (power)
- Relay push offs
 - (technique & nervous system & strength)

Kids Hockey

- Frequency oriented skating w/ change of direction
 - (leg speed, orientation)
- Plyometrics w/ upper body involvement
 - (power)
- Relay push offs
 - (technique & nervous system & strength & balance)

3. Training

Exercises for Technique/Agility

Youth/Adult Speed

- Slide board
 - (direction of push & regrouping)
- Dryland (mirror)
 - (instant feedback)
- Inline Treadmill (mirror)
 - (instant feedback)
- Video

Youth/Adult Hockey

- Slide board w. stick handling, obstacles
 - (direction of push & regrouping & agility)
- Dryland w/ stick
 - (instant feedback)
- Inline Treadmill
 - (instant feedback)
- Video w/wo pressure situations

3. Training

Exercises for Technique/Agility

Kids Speed

- Slide board
 - (direction of push & regrouping & strength)
- Imitation
 - (movement)
- Video

Kids Hockey


- Slide board w/ stick handling
 - (direction of push & regrouping & strength)
- Imitation/slow motion
 - (movement)
- Video

4. Possible transfers to Ice Hockey

- **Power Skating Position (PSP)**
 - **SIT - Strength In Transition** (4-way hip and core stability)
 - small angle in knee and ankle (think of unlacing top eyelet)
 - get down on your push

4. Possible transfers to Ice Hockey

- Gaining momentum by adding mass to center of gravity
 - Regroup
 - Drive knee under center of mass
- 100% bouts
 - Do it or leave it!



Go fast -
be first at the puck -
score the goal!

Thank you!

INTERNATIONAL ICE HOCKEY FEDERATION

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