IN SHAPE FOR IN-LINE

BJ Rule makes sure we are in line for unparalleled programming for our roller blading clients

trainer

What only a couple of decades ago was a means for ice skaters to keep active when there wasn't any ice, has now flourished into a sport, and indeed culture, all of its own. In-line skating or roller blading (the wheels or blades run length ways from toe to heel on the skate) has surpassed its predecessor roller skating, and has branched out into a number of sports. Throughout the 90s the numbers of participants in recreational in-line skating was on the rise. According to the International In-Line Skating Association, participation numbers peaked at over 32 million in 1998. People were ditching their roller skates and replacing them with blades or in-line skates.

Whichever form of in-line skating/roller blading, whether its aggressive/freestyle skating, artistic skating, roller hockey, speed or endurance skating or just recreational skating for fun and fitness, your body is going to need to be prepared. Prepared for the aches and pains to come and most importantly prepared to lessen the risk of injury.

As the sports where in-line skates are used vary greatly, different components of fitness are required for each. If an individual is a speed skater they will need to train explosively, whereas a marathon skater or freestyle skater will need to train quite differently. Despite different needs for the different styles, formats and events, the actual skating component, i.e. moving around on the skates, is generally the same. You need to be able to move forwards and backwards, sideways, turn and stop. The most important considerations before designing and implementing a training programme is the individual. Ascertaining their strengths and weaknesses is vital before a programme is put together.

If you have read any previous articles in *trax* by Dax Moy, you should by now be beginning to understand what is involved in both assessing and designing a programme for an individual. By using the KCA (Kinetic Chain Assessment) as a means of assessing the working order of a person's kinetic function, you will be able to determine the working order of the joints, muscles and motor patterns.

Skater profiling

Prior to implementing a programme for our skater we need to now how their body is working. As seen in earlier articles in Dax's series we need to determine:

> Which muscles are facilitated?
> Which muscles are inhibited?
> Patterns of synergistic dominance
> Postural distortion patterns
> Inner/outer unit dysfunctions
> Motor pattern irregularities
> Functional range of motion compensations

As you have probably discovered from the previous articles, at first this may appear complicated but it is actually an essential and relatively easy means of understanding the working order of the individual's body. By understanding the above, the ensuing programme and its effectiveness will have a greater impact both with performance and the lessened chance of injury. A thorough means of determining the above is to perform a KCA.

When performing a KCA on an in-line skater we will often find the following:>

Static posture
In-line skaters will characteristically have tight or over-facilitated hip flexors as well as tight Tensor fascia latae and Iliotibial bands. They will therefore often display anterior tilting of the pelvis and slightly bowed or lateral tracking of the knees. Both of these are created by dominance patterns occurring due to myofascial shortening of the hip flexors and the lateral musculature of the upper thigh.

Fundamental movement profiles
Using a squat, lunge or overhead squat as a means of assessment, the following movement patterns will likely present for an in-line skater:

> External rotation of the feet: Dominance of outer thigh musculature.

> Lateral deviation at the knee: Again over facilitated lateral thigh musculature, weaker adductor muscles and inhibited gluteals.

> Anterior pelvic tilt: Dominant and over facilitated hip flexors, inhibited and weaker lower abdominals.

Obviously due to the different activities that can be performed on in-line skates, some of the above will vary from sport to sport, as well as between individuals.

Core function assessment
This is crucial, as it is from the core and inner unit that an individual controls their limbs. The stronger the core, the better an individual will be poised and balanced as well as able to move.

Proprioception assessment
Assessing a skater's balance and spatial awareness will also be required. Both of these will need to be trained, the extent of time required for these components will be determined by the results of the assessments.

Neurological recruitment assessment
Determining relationships between opposing musculature is also vital in assessing any individual. When certain muscles become facilitated, the opposing muscle of a joint can become neurally inhibited.

These relationships can in turn affect muscle recruitment. For example, when skating an individual is flexed at the hip for most of the time, the likelihood of over facilitated hip flexors is therefore great. Over-facilitated hip flexors reciprocally inhibit the opposing gluteal muscles. The inhibited gluteal muscles can then become synergistically dominated by (take over part of the function of) the erector group and the hamstring muscles. Length tension relationships across a joint should also be investigated as part of these assessments.

Range of movement assessment
This ties in very closely with the above neurological recruitment assessments and length tension relationships. Due to the nature of in-line skating (as an individual can often fall) excellent range of movement across joints and the whole body can prove vital. If there is excessive or limited range of movement the chance of altered function and therefore the likelihood of hitting the pavement is increased.

Activity demand analysis
As mentioned previously, the type of activity that can be performed by an in-line skater can vary depending on the sport. A thorough understanding of the sport, the skills and bio-motor abilities required, is needed prior to programme design.

Bio-energetic demands
This refers to the energy system used in the activity. An in-line sprinter will need to train anaerobically, an aggressive extreme skater will perform under lactic demands and a marathon skater will perform mostly aerobically. So, depending on the sport, the individual's training will need to focus on the energy system used.

Muscle contraction spectrum
Again this can vary depending on the sport played. However, in all cases the individual will need to be strong in the lower body. The musculature of the legs can stabilise, slowly contract and can be powerfully explosive, just to enable an individual to move. Both the knees and the hips rarely, regardless of the activity, come out of a semi-flexed position. Therefore both isometric and semi-isometric contractions should be trained, along with concentric and eccentric contractions of the lower body.

Contraction velocity spectrum
The contractions can be slow and controlled or fast and explosive dependent on the sport. The action of skating itself is generally slow and controlled. As more speed is needed for whichever activity, or as greater levels of agility and manoeuvrability are required, the more explosive the contraction velocity will need to be.

Dominant plane of motion
If an individual is skating forwards, the upper body remains in the saggital plane to create movement. The legs however abduct from the body in the frontal (side to side) plane. If the skater is a sprinter or marathon skater and all that is needed is propulsion in the saggital plane, then training and preparing in this plane (squats and lunges) will suffice.
If, however, the individual is an in-line hockey player or aggressive freestyle skater, turns, tricks and changes of direction will mean that rotation and movement in the transverse (rotary) plane will also need to be trained.

Activity duration
This, as you have probably realised, is hugely dependant on which sport the skater is participating in. A sprinter may need to perform for as little as 10 seconds, a marathon skater for hours, figure and aggressive skaters a matter of minutes and, depending on the level, an in-line hockey player performs minutes at a time or the duration of a whole hockey game.

Programming
As in Dax's previous articles in this series, exercises, sets and reps will not be prescribed here. A look at the major muscles used will
be outlined below. This, plus a thorough examination of all the above, will allow you to determine exactly what to prescribe for your skater athlete, whatever their discipline:

Tibialis anterior
Used isometrically in a semi-dorsiflexed position to keep the skaters forward lean.

Soleus
Used eccentrically and isometrically to stabilise at the ankle. Can work in co-contraction to hold the skater in their forward lean.

Hamstrings
Used in the equivalent of the toe-off, to flex the knee, to pick that leg off the ground. Also used to assist the gluteus maximus in hip extension.

Quadriceps
Used quasi-isometrically to hold the semi-flexed position at the knee but also used explosively to propel movement.

Gluteus maximus
Maintains the flexed position at the hip through isometric and quasi-isometric contractions. Also used throughout the contraction velocity spectrum, freestylers for example will need to use the glutes explosively so they can jump for height and or distance.

Adductors/abductors
Used greatly to allow change in direction as well as the ability to move forwards and backwards, left and right. If more movement is needed in the frontal plane, the more these muscle groups will be required. They are often neglected in training programmes, so too is consideration for the frontal and transverse planes.

Erector spinae
Maintain correct lumbar positioning while skating. Needs to be strong isometrically, to hold the forward lean position.

Most of the above are muscles found in the lower body. As well as these, the muscles of the core are extremely important, especially the abdominal muscles.

Rectus abdominis
Important in isometrically stabilising the spine and pelvis.

Internal/external obliques
These muscles control rotation of the trunk. They are extremely important for any of the skaters needing to perform movements in the transverse plane. Depending on the discipline or sport played, the time given to conditioning the muscles of the upper body will vary. In-line hockey players for example need strong upper bodies to absorb impact and apply force, whereas marathon skaters need very little upper body strength.

Conclusion
As outlined above, the amount of activities and sports that can be carried out on in-line skates is hugely varied. It is essential that prior to commencing any programme, a thorough understanding of the activity is achieved. It is also vital that every individual is assessed subjectively. Determining and understanding an individual's strengths and weaknesses, as well as physiological and bio-mechanical make-up, will go a long way to ensuring a successful training programme.

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