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INSIGHTS

Arches and training proactive and reactive balance control

By physiotherapist Hannah Harboe

This Gonge Insights describes proactive and reactive balance control based on a real case. Regardless of age, every one of us needs to practise and train our proactive and reactive balance control at our own personal level of motor skills. The case describes how we can use Arches to train elite sports people's proactive and reactive balance control. The same method can be used with adults and children.

Before we can perform a movement that requires balance, our brain has to assess precisely what is needed to keep our balance while we perform this movement. How much strength will it require, which muscles will I have to activate and how large a movement should I make?

To assess these issues, our brain receives input from our sensory systems:

- We assess the degree of difficulty of the movement, its height and length using our sense of sight.
- We assess the underlay beneath our feet and the underlay we will move to using our sense of touch.
- Via resonance, we use our sense of hearing to assess space and direction.
- We use our proprioceptive sense to assess how to position our joints and how to tense and relax our muscles so that the movement is successful.

Our brain works fast to prepare for the movement. This process is called proactive balance. We prepare for the movement and we assess the risks.

During and immediately after the movement, our senses work very fast to take corrective action so that the movement is successful. Using the same senses, our body ensures that we maintain our balance and control. This process is called reactive balance. We make corrections and stabilise.

In the vast majority of cases, our senses work together (integration) to make sure that we perform the movement successfully.

If, however, something unexpected happens during the movement and the proactive process does not correlate with the reactive response, e.g. if we misjudge the movement, if we are suddenly jolted during the movement, if we are disturbed by a noise or if the underlay shifts. In a situation of this kind, we lose control and we lose our balance. Sometimes we fall and no harm is done. At other times, a fall can cause serious joint and muscular injuries. A fall, which is a failed attempt to move, can also have an impact on our self-confidence.

Arches are designed so that the elements are easy to stack. They have a broad rubber edge that ensures that they are stable. The rubber edge prevents the elements from sliding apart when stacked. The more Arches you stack, the more unpredictable their movements – and therefore the more difficult they are to balance on.

Using Arches, you can work with an easy progression. One element laid on the floor makes a small bridge that even a small child can cross. If the element lies like a seesaw, it is mobile and therefore more difficult to balance on. If you build one arch on top of another to form either an "eye" or an "hourglass" shape, you need to have a good sense of balance to climb and stand on them and make them rock from side to side.

To train reactive and proactive balance control, we use the "hourglass" and the "eye". The subject jumps up onto the Arches and must control his/her landing. Alternatively, we build a row of Arches and jump from one "eye" or "hourglass" to the next in a controlled movement.

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Case:

Helena is an active young lady who plays elite handball. She has joined the national talent squad for young people.

During a training match, she is unfortunate to be pushed as she jumps up. She lands awkwardly and damages the cruciate ligament in her right knee.

Helena undergoes surgery to reconstruct the ligament. Six weeks after surgery, she begins an intensive rehabilitation programme.

She has been in rehabilitation for two months and has almost recovered. Helena begins to train with her handball team. While Helena is just as strong and agile as before her injury, she feels that she is still moving slower and is afraid of falling again.

I explain proactive and reactive balance control to Helena. I tell her that this is what we have to work with, so that she can regain her confidence and speed.

Using six Arches, we build three “eyes” in a row. I ask Helena to jump up onto one “eye” and stop it from rocking before jumping onto the next. To begin with, she jumps with her feet relatively close to each other. As she progresses, she jumps with a greater distance between her feet, which makes the unpredictable rocking movement larger and the “eye” more difficult to balance on.

At first, Helena needs support before she dares jump up onto the “eye”. She quickly gains confidence enough to jump up unaided.

I give Helena six Arches so that she can train at home on a daily basis.

She returns after a week. Helena can now jump up and has no difficulty in finding her balance even with a foot at each end of the Arch. Now we begin to work with predictability and speed of movement. After each jump, I give Helena new instructions that she immediately has to convert into action: “Jump forward, feet together” or “Jump backwards, feet apart”. My instructions indicate in which direction Helena must jump and whether her feet should be close together or wide apart. Finally, Helena begins to devise challenges for herself. She begins to jump over, jump sideways down onto the floor and up again, etc. This is training proactive and reactive balance control at a high level. Helena finds that her knee is fully functional and that she very gradually becomes just as confident and can move just as fast as she did before.



After a further three weeks’ training, we sign her off. Helena returns to her handball team at the same level as before – and she is so pleased to be back.

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