ABR Fascia Gel for Cerebral Palsy

Bioactive proteins facilitating the recovery of the 'liquid' and 'fibrous' fascia –helping the mobility and stability of muscles, ligaments, joint capsules

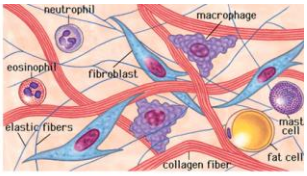
Cerebral Palsy is a disorder of posture and movement that is rooted both in the neurological deficiency caused by brain injury but also in the structural deficiencies affecting the anatomical network of movement system – muscles; tendons; ligaments; joint capsules. However, as modern fascia science shows, the structural difficulties are not limited to these well-defined anatomical elements but spread through the entire network of all the tissues that have mechanical contribution: skin; adipose tissue; retinacula; bone and periosteum; other forms of connective tissue.

In fact, most recent scientific findings invite us to have a truly global look at the entire system of fascia/ extracellular matrix as a unified mechanical network that distributes all the loads and stresses acting onto human bodies.

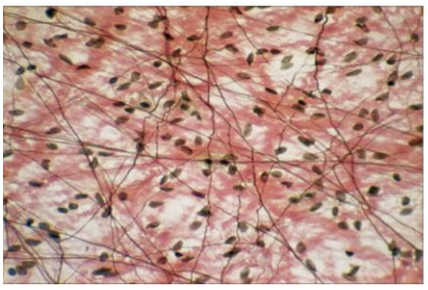
"Extracellular matrix (ECM) is a diverse collection of proteins and sugars surrounding cells in all solid tissues; mainly composed of an interlocking mesh of fibrillar and non-fibrillar collagens; elastic fibers; glycosaminoglycan (GAG)-containing non-collagenous glycoproteins (hyaluronan and proteoglycans)" (Cox, 2011) "ECM provides a structural scaffold on which cells grow, differentiate, organize, and function. ECM of bones and connective tissues bears most of the physical loads acting on our body" (Chiquet, 2009; Tschumperlin, 2014).

This is how it looks visually:

Extended & more **complete definition of *Fascia*** = the entire ***Extra-Cellular Matrix (ECM)***

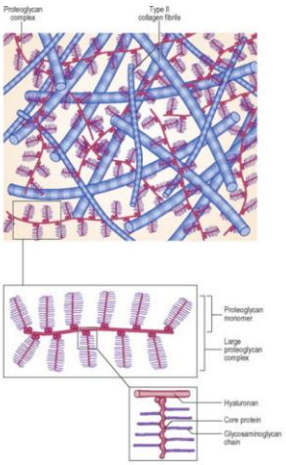


ECM= Fibers + Interstitial Liquid 'Gels'



ECM= Fibrous tissues + Interstitial Liquid 'Gels'

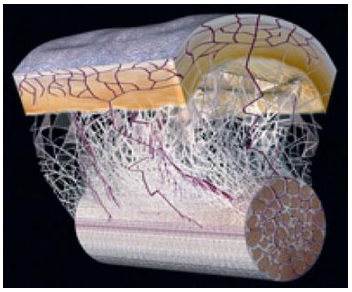
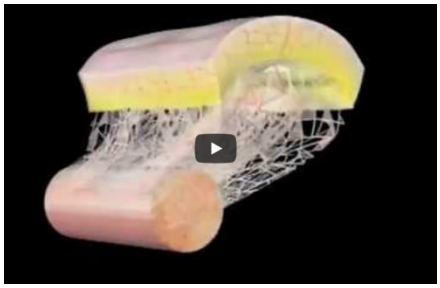
The ECM:
Blue *fibers*: collagen fibres
Red *cords*: proteoglycan complexes which bind to the collagen surface



Therefore all of the specific challenges experienced by children with Cerebral Palsy – spasticity, rigidity, dystonia, joint stiffness; hypermobility; instability; muscle hypotone; shortened tendons; over crystallized ligaments; contractures; etc. – have to be seen in a much broader context of the entire extracellular matrix / fascia.

In other words, we have to update our perspective at all these cerebral palsy challenges and recognize that it is the Fascia network that controls the muscles; tendons and ligaments – limiting or enhancing their performance.

FASCIA CONTROLS THE MUSCLES, TENDONS AND LIGAMENTS

  (J.C. Guimbertau, 2009-2018)

These pictures show how the individual longitudinal anatomical elements – muscles; ligaments; tendons are embedded into extracellular matrix/ fascia that surrounds and guides them as a 'Velcro grip'.

As a result we face **4 main types of the Fascia Dynamics challenges:**

TYPE 1	Fascia too loose\ Fascia too 'watery'	Slides and sinks too easily \Looks thick and puffy
TYPE 2	Fascia too loose\ Fascia too fibrous	Slides and sinks too easily being too detached \Looks thin and skinny
TYPE 3	Fascia too stiff\ Fascia too ' glued	Restricts the movement\ Looks thick and tight; forms lumps , cuffs and scars
TYPE 4	Fascia too stiff\ Fascia too fibrous	Restricts the movement being too attached\ Shows strong thin 'cords' and sheaths

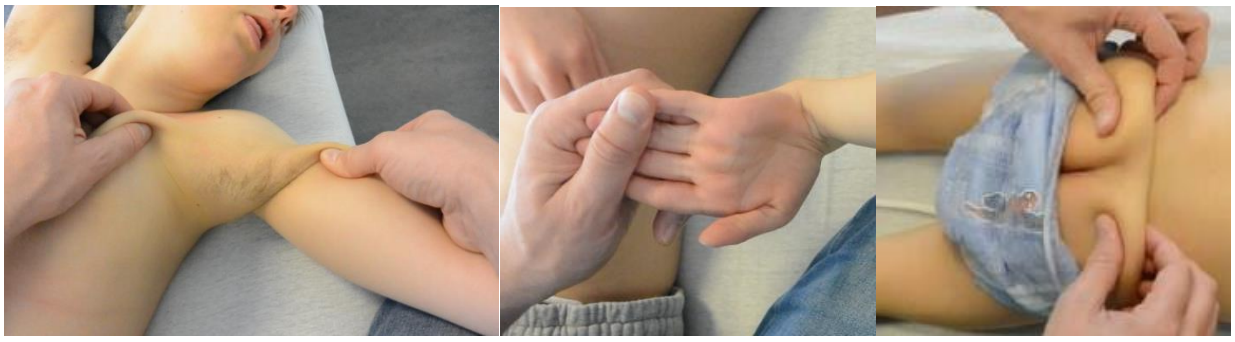
Which then manifest over **2 primary directions**:

TYPE T	In response to tension ('opening the joint')
TYPE C	In response to compression ('closing the joint') – sinks excessively

Let's see how these scenarios look in real life cerebral palsy cases:

Arrows indicate the primary focus

Type 1 T Skin, Muscles and Ligaments (too 'watery' /too detached/ excess sliding)



Type 1 C Skin, Muscles and Ligaments (too 'watery' / too weak/ excess sinking)



Type 2 T Skin, Muscles and Ligaments (too thin /too detached/ excess sliding)


Type 2 C Skin, Muscles and Ligaments (too thin / too weak/ excess sinking)


Type 3 T Skin, Muscles and Ligaments (too glued/ too thick/ restricting extension)



Type 3 C Skin, Muscles and Ligaments (too glued/ too thick/ restricting compression)

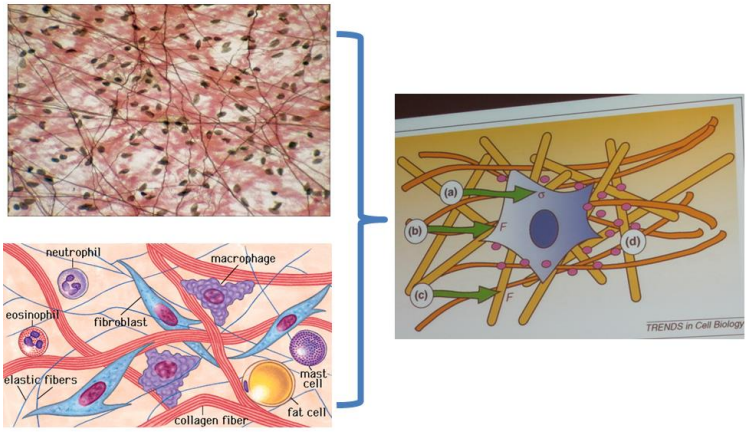
Type 4 T Skin, Muscles and Ligaments (too stiff/ too thin/ restricting extension)

Type 4 C Skin, Muscles and Ligaments (too stiff/ too thin /limits compression)

As we can see in those illustrations In Cerebral Palsy the entire ECM network experiences multiple imbalances, where the Types 1 and 3 as well as Types 2 and 4 usually lead to a ‘double trouble’ affecting both directions of movement and making muscle, tendon and ligaments control very difficult and limited.

Is it possible to help Cerebral palsy children by remodeling ECM and to reverse once-established ECM “structure”? Fortunately – yes. “Both the proteins and sugars of ECM undergo a mechano-regulation process, that includes the deposition, rearrangement, and removal of matrix to maintain overall form and function” (Humphrey, 2014) (Chiquet, 2009).

‘Fibrous’ and ‘Liquid’ Fascia – developing the right image in your mind’s eye



What are the internal agents of ECM structural maintenance and renewal? – **The fibroblasts** are considered the key players in ECM maintenance and adaptation to changes in homeostasis and remodeling (Kjaer et al., 2010; Tschumperlin, 2014).

So far so good. We see solid proof that fibroblast activity within the ECM has an immense remodeling and structural reversibility capacity in self-healing mode. But where is the tipping point? Why does the regenerative self-healing sometimes take place but at other times not? How can we tap into this remodeling capacity of the fibroblasts in a systematic, predictable and guided way?

The answer is in *the state of activity* of the fibroblasts.

Fibroblasts HAVE the capacity to remodel the Fascia – but are they ‘awake’?!

The ‘Sleeping Beauty’?

On Active Duty!

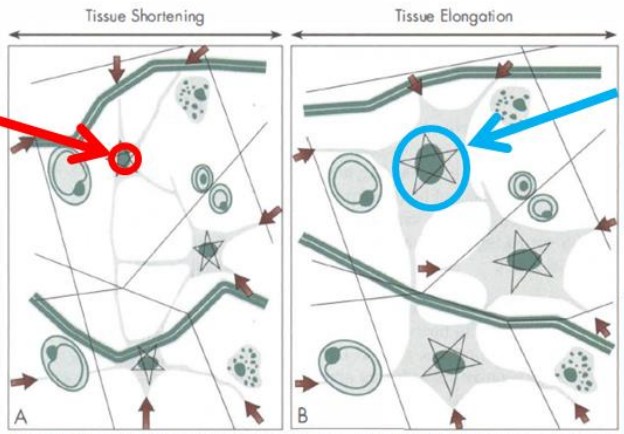


Figure 1-1 Proposed Model for Fibroblast Dynamic Cytoskeletal Response to Tissue Shortening and Elongation with Resultant Cellular and Tissue Forces. The shortened tissue (A) shows fibroblasts having a “dendritic” morphology as a result of microfilament tension, causing disassembly of the microtubule. When the force between microfilament tension and microtubule assembly is balanced, fibroblasts in elongated tissue (B) have a “sheetlike” morphology. Arrows inside fibroblasts represent tension inside the cell. Arrows outside fibroblasts represent the “pull” exerted by the cells onto the ECM.
Source: Langevin et al. (2004).

Dormant fibroblasts

Motivated fibroblasts

'Motivated' fibroblast networks

The fibroblasts are capable of extracellular matrix (ECM)/ Fascia remodeling and repairs even in cerebral palsy but only when their networks are in the motivated state. If the fibroblasts are dormant the nothing positive is happening and the situation keeps getting worse as we see in the prognosis of cerebral palsy children.

How can we help the fibroblasts to get from dormant into motivated state, so that they can start the productive remodeling and repairs of ECM/ Fascia?

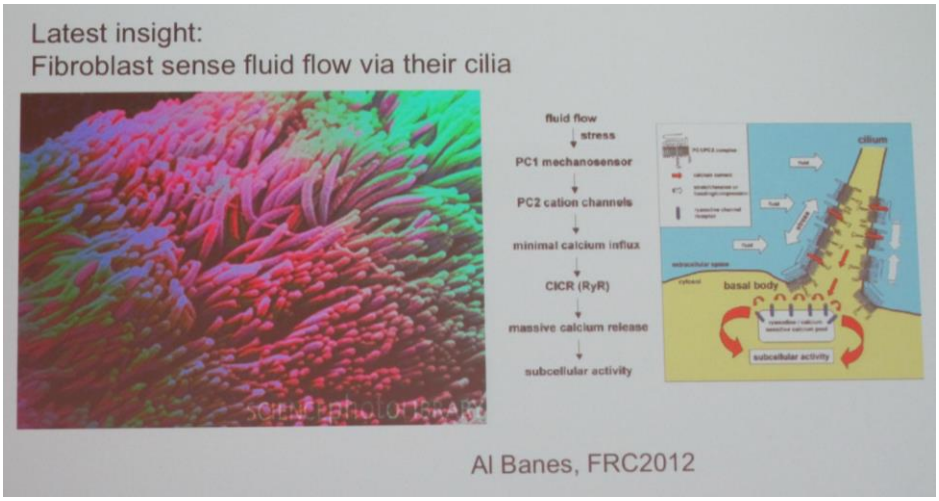
The main source of fibroblasts motivation is via properly done mechanical stimulation – that's what ABR Techniques are designed for.

However, there are additional avenues that are able to help and to speed up this process of fibroblasts motivation.

"Extracellular matrix (ECM) is a diverse collection of proteins and sugars surrounding cells in all solid tissues; mainly composed of an interlocking mesh of fibrillar and non-fibrillar collagens; elastic fibers; glycosaminoglycan (GAG)-containing non-collagenous glycoproteins (hyaluronan and proteoglycans)" (Cox, 2011)

That's why the fibroblasts are sensitive to the interstitial flow within the ECM. In other words – when ECM elements are 'glued' together; or being too loose; or being too thin; or being bundled together – the fibroblasts end up in the dormant state and stop doing their remodeling job. All these are so-called THIXOTROPIC properties of tissues (the flow of the interstitial fluids)

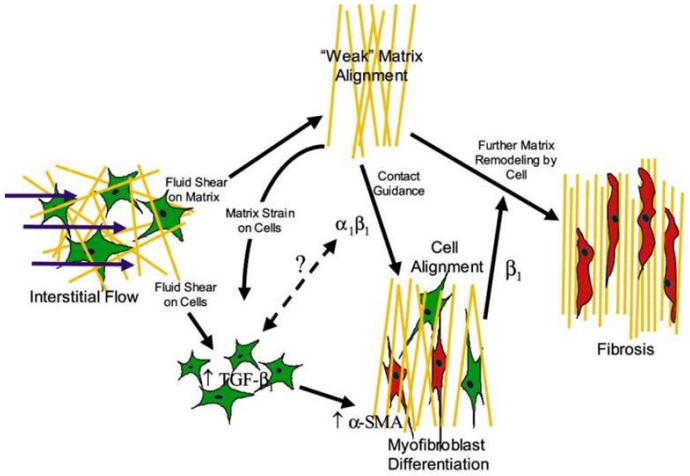
That's where the BIOACTIVE PROTEINS that improve the thixotropic properties of fascia are capable of helping the situation by 'ungluing' the extracellular matrix.



Proposed mechanism of interstitial flow-driven myofibroblast differentiation and matrix remodeling:

First, flow itself can impose shear stress on the cells directly and strain on the cells via stresses on the ECM fibers to which the cells attach. Either of these may trigger TGF-β1 expression, the latter through α1β1 integrin signalling. TGF-β1 drives α-SMA expression as the fibroblasts differentiate into myofibroblasts and align the matrix fibers.

Proposed mechanism of interstitial flow-driven myofibroblast differentiation and matrix remodeling.



Ng C P et al. J Cell Sci 2005;118:4731-4739

Journal of Cell Science jcs.biologists.org

This mechanism of "waking up' the dormant fibroblasts and switching them to the 'motivated state' not only has been explained theoretically but also proven to work.

This is exciting news because it opens a new potential for helping the children with cerebral palsy who suffer the most from the thixotropic challenges within ECM / Fascia and the inability

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Fluid shear stress regulates metalloproteinase-1 and 2 in human periodontal ligament cells: Involvement of extracellular signal-regulated kinase (ERK) and P38 signaling pathways

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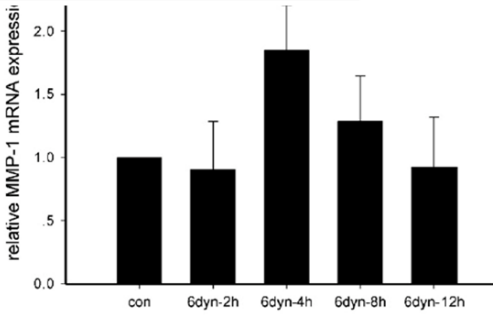
Tiny amounts of fluid shear (6 dyn/cm^2) through the matrix increase MMP-1 expression.

MMP-1 is the main component made by fibroblasts to break down excessive collagen.



ABR Fascia Gel

ABR offers a consistent solution that uses the proven bioactive proteins to help improve the ECM/ thixotropic properties and thus to activate the previously dormant fibroblasts and to make them motivated.

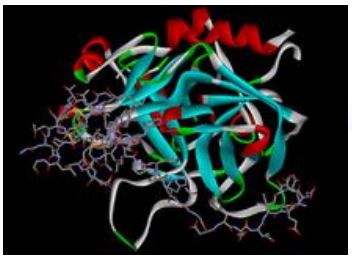
How it works:

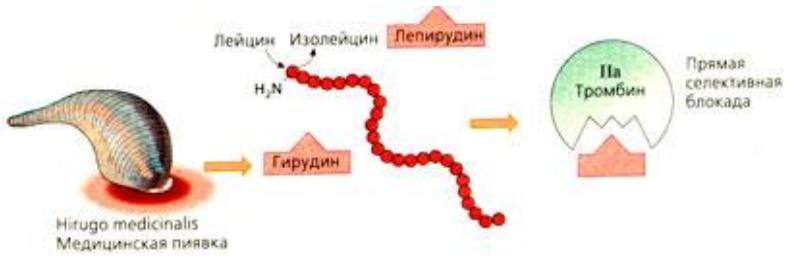
ABR Gel uses a combination of bioactive proteins in the all-natural compound where the main ingredient is hirudin that is extracted from leech saliva.

What's in it? …

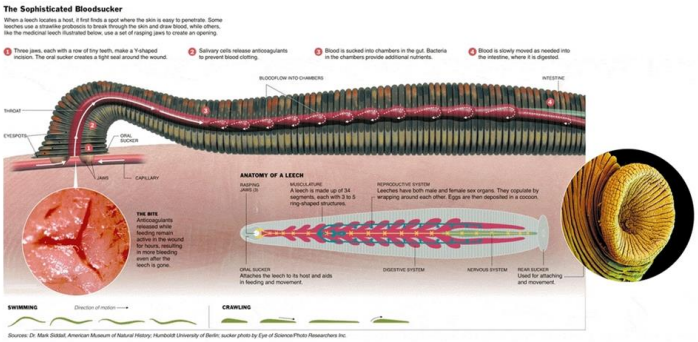
Leech – an ugly but the safest and laziest among all the 'bloodsuckers'

Hirudin is a well-known component, which is very difficult to extract. Pharmaceutical industry uses the synthesized version for some blood disorders but we have focused on an all-natural solution that uses the real extract in the proportions that are optimized for improving the thixotropic properties of ECM – 'ungluing' the fascia!



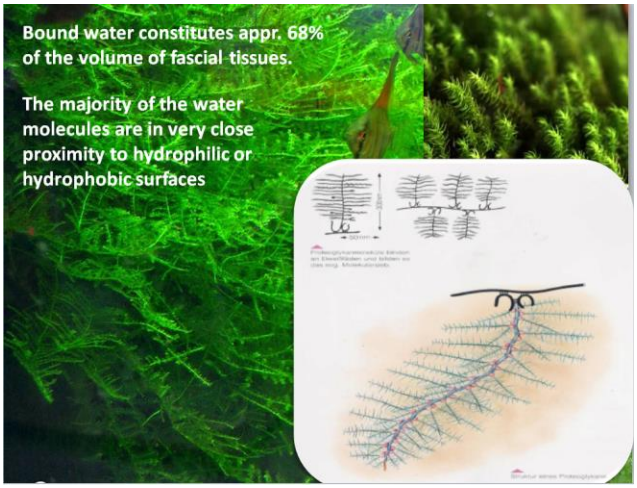


What's in it? …

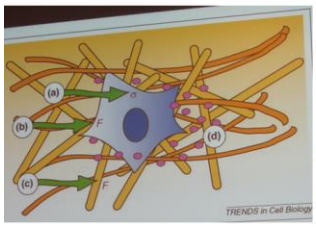


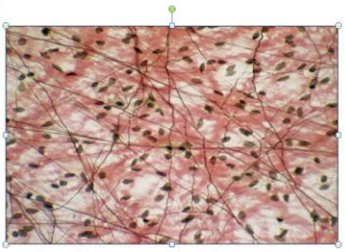
The Lazy Leech:
Hirudin – dilutes the plasma = interstitial gel – so it flows itself

The ABR Fascia Gel has a wide range of applications. This is the cascade that it activates thanks to the improvement of hydration and the thixotropic properties of fascia:



Improving fascia hydration in order to wake-up the 'dormant' fibroblasts and make them MOTIVATED!





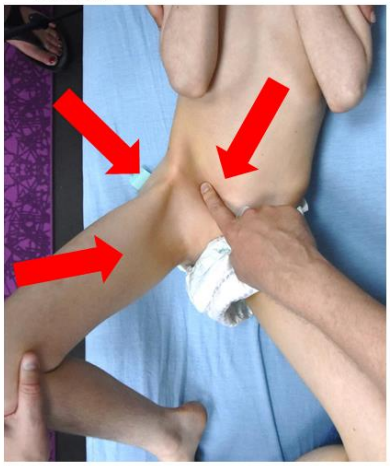
Great News: Mechanical Result WITHOUT the Mechanical Work is Realistic!

Fibroblasts are the universal 'workers' and the re-builders of the entire fascia system – that's why the applications of ABR Fascia Gel is effective for all **4 main types of the Fascia Dynamics challenges.** It works for Types 1, 2, 3, 4 and both for tension (T) and compression (C) scenarios.

Here is an example of ABR Gel effectiveness.

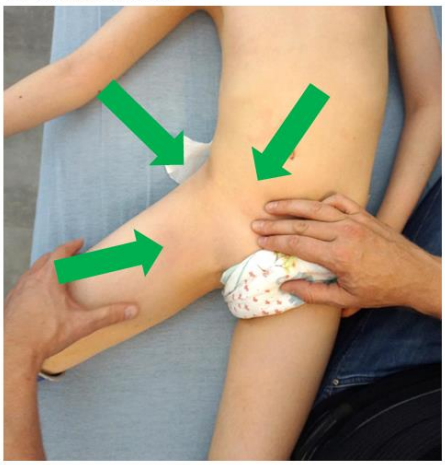
ABR 'FASCIA GEL' EFFECTS 12 MONTHS. DAILY.

BEFORE



- Hip flexor – shortened/ tight
- Pubic fascia – depleted/ skinny
- Inner leg 'pit'– empty / triangle

AFTER 12 months

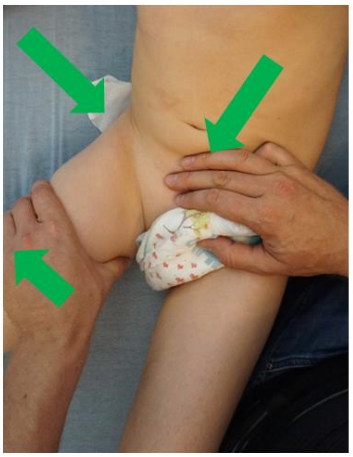


- Hip flexor – lengthened/ relaxed
- Pubic fascia – filled up/ attached
- Inner leg 'pit'– filled up / rounded

BEFORE

- Hip flexor – shortened/ tight
- Pubic fascia – depleted/ skinny
- Internal rotation – leg/pelvic conflict

AFTER 12 months



- Hip flexor – lengthened/ relaxed
- Pubic fascia – filled up/ attached
- Internal rotation – leg/ pelvic independence

ABR Gel is hypoallergenic and easy to use.

Just apply the very thin layer 2x times a day in the areas specified in the **ABR Gel Recommendation Form.**

ABR Gel Recommendation Form is a document that we prepare individually for every child under ABR Program, creating both the easy guidance for your applications and at the same time providing the opportunity to trace progress from year to year.

I am very excited to introduce the New all-natural ABR Fascia Gel for all the ABR families in Denmark and looking forwards to seeing and tracking the progress.

ABR Fascia Gel is an important catalyst of your home program that helps you to achieve better and faster results in your child's progress through home training by addressing both mechanical and thixotropic properties of extracellular matrix (ECM)/ Fascia at the same time!

Sincerely

Leonid Blyum