Output 1:

Clinical case 1

FutureFeet

Co-funded by the Erasmus+ Programme of the European Union

Questions/remarks can be forwarded to
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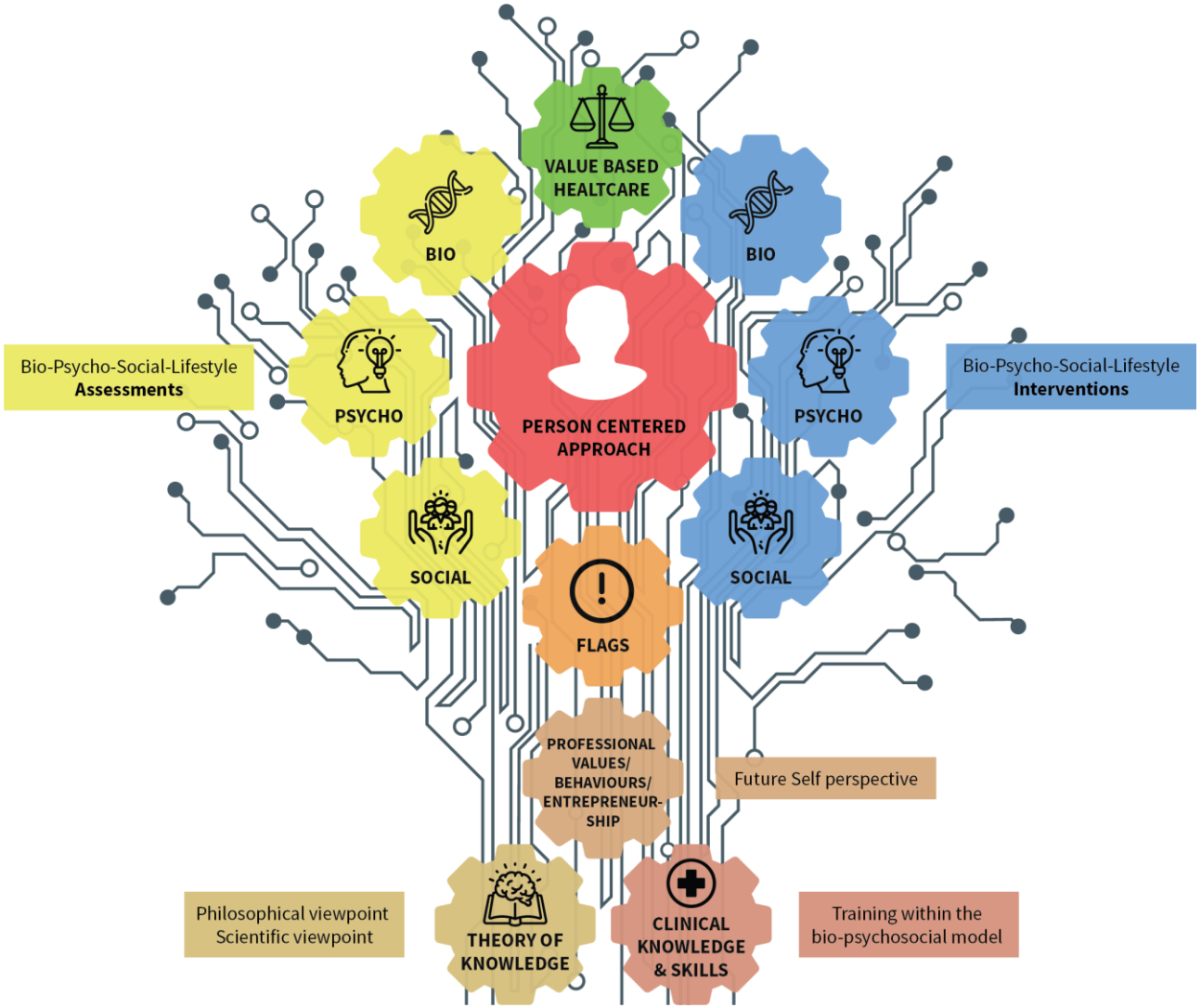
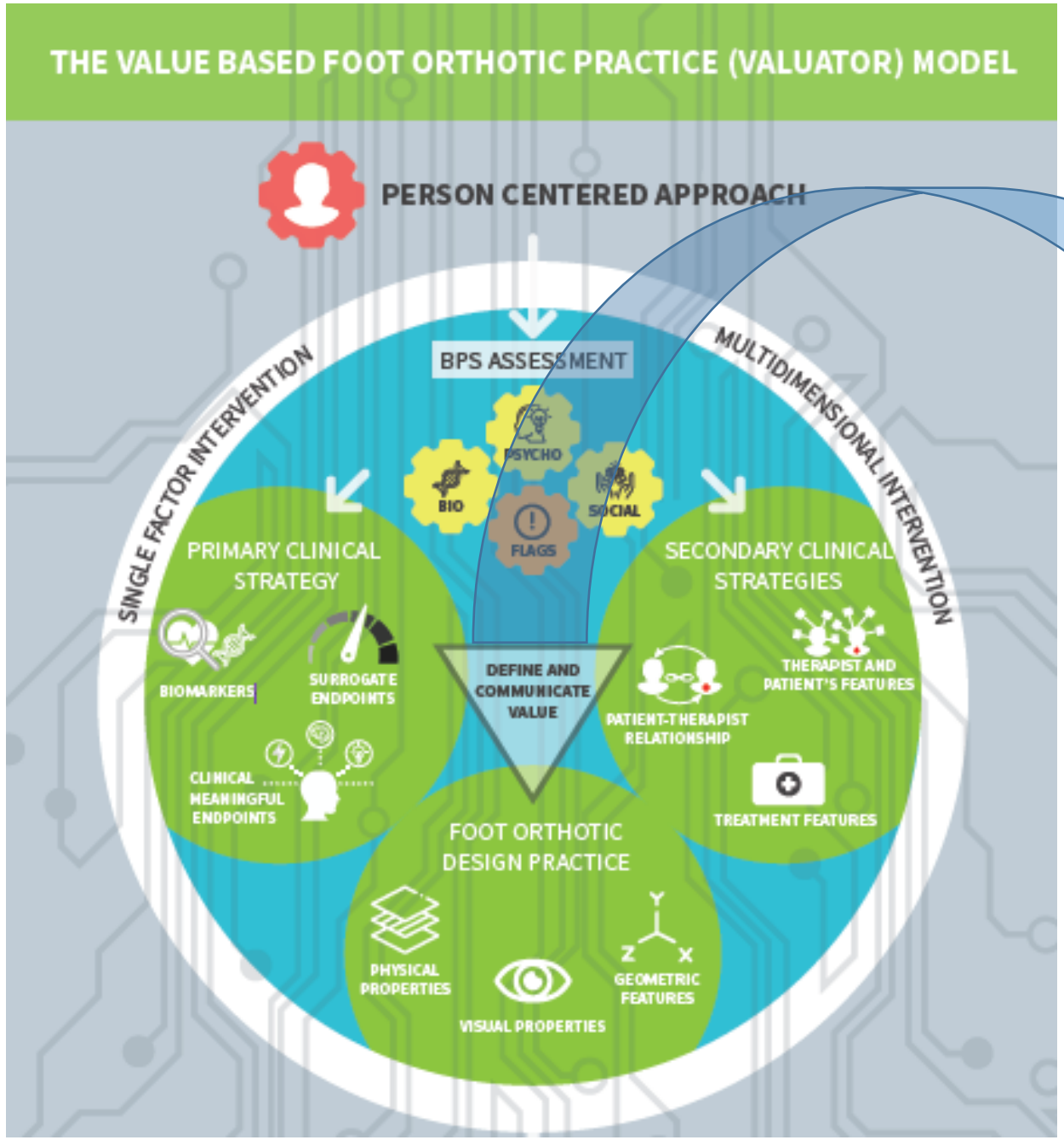
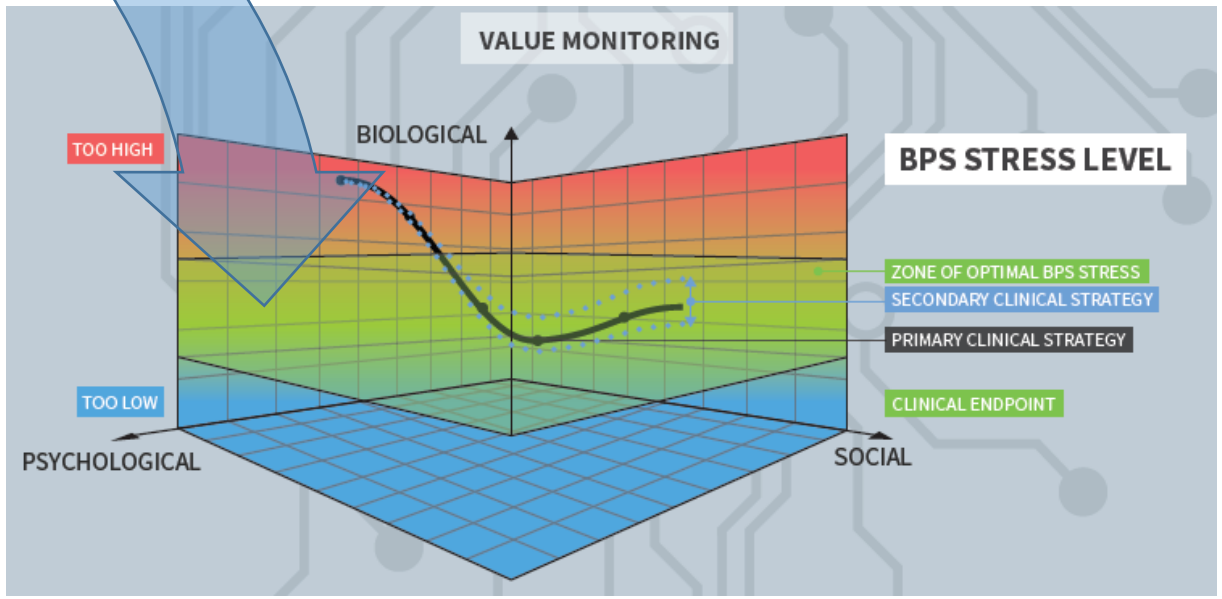
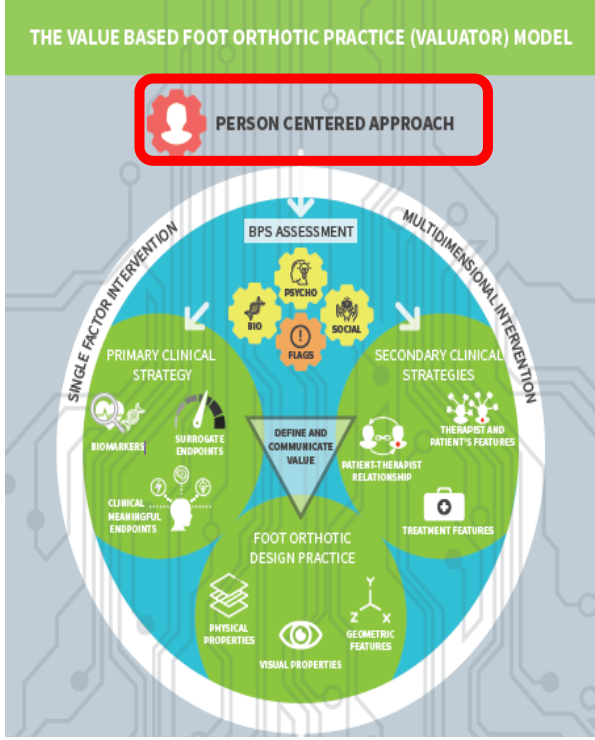
The ValuE BaseD DIgiTal FOot CaRe Framework (EDITOR FRAMEWORK)



"A conceptual framework for contemporary professional foot care practice. "


THE VALUE BASED FOOT ORTHOTIC PRACTICE (VALUATOR) MODEL
PERSON CENTERED APPROACH
BPS ASSESSMENT
PSYCHO
BIO
SOCIAL
FLAGS
SINGLE FACTOR INTERVENTION
MULTIDIMENSIONAL INTERVENTION
PRIMARY CLINICAL STRATEGY
SECONDARY CLINICAL STRATEGIES
BIOMARKERS
SURROGATE ENDPOINTS
CLINICAL MEANINGFUL ENDPOINTS
DEFINE AND COMMUNICATE VALUE
PATIENT-THERAPIST RELATIONSHIP
THERAPIST AND PATIENT'S FEATURES
TREATMENT FEATURES
FOOT ORTHOTIC DESIGN PRACTICE
PHYSICAL PROPERTIES
VISUAL PROPERTIES
GEOMETRIC FEATURES
Y
Z
X

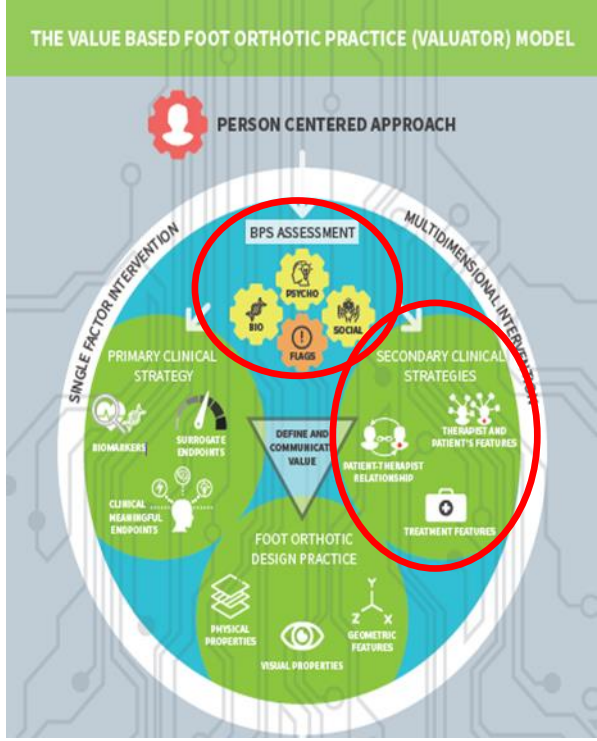

VALUE MONITORING
BIOLOGICAL
TOO HIGH
TOO LOW
PSYCHOLOGICAL
SOCIAL
BPS STRESS LEVEL
ZONE OF OPTIMAL BPS STRESS
SECONDARY CLINICAL STRATEGY
PRIMARY CLINICAL STRATEGY
CLINICAL ENDPOINT



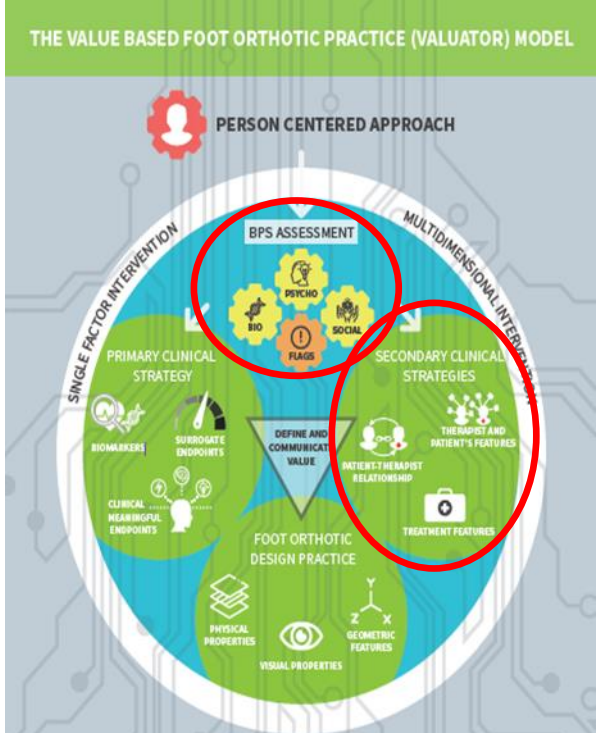
- A 55-year-old mechanical engineer presents with pain in his left foot for 9 weeks but has been experiencing discomfort in both feet for more than 9 months.
- Pain is located around the medial malleolus and medial arch.
- The patient has no other disease, except for hypertension.
- Conservative treatment: 2 weeks NSAID's and physical therapy
- The patient reports increased work-related stress due to: 1) absenteeism (2 weeks the last two months) and 2) less productivity and comfort.

Physical examination

- Pain at palpation over the left tibialis posterior tendon
- Pain : VAS 7/10 (when at its worst)
- On standing, increased heel valgus and forefoot abduction were noted bilaterally (navicular drop of 9mm).
- A forefoot supinatus of 10 degrees was observed bilaterally.
- No signs of muscle weakness during manual muscle testing



Physical examination



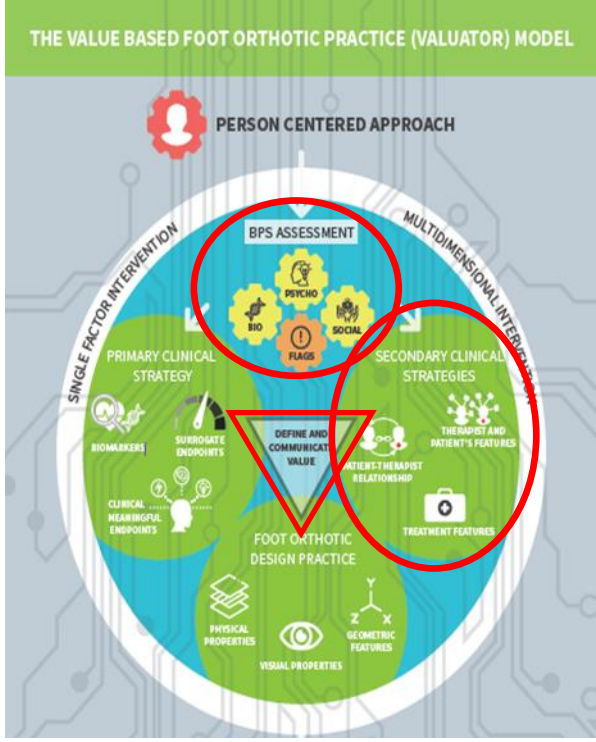
- Doming and toe flexion testing revealed poor muscle selectivity and force.
- Suboptimal control of the pelvis, knee and foot in the frontal plane during unipodal squat
- No leg length discrepancy
- BMI of 28.5 kg/m² and increasing bodyweight due to foot pain and reduced physical activity. This frustrates the patient considerably.
- Blood sample: OK

03/07/2020

Patient Reported Measure about depression

Patient Health Questionnaire (PHQ 9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? *(Click on your answer)*	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	○	◉	○	○
2. Feeling down, depressed, or hopeless	○	◉	○	○
3. Trouble falling or staying asleep,or sleeping too much	◉	○	○	○
4. Feeling tired or having little energy	○	◉	○	○
5. Poor appetite or overeating	◉	○	○	○
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	○	◉	○	○
7. Trouble concentrating on things, such as reading the newspaper or watching television	○	◉	○	○
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	◉	○	○	○
9. Thoughts that you would be better off dead,or of hurting yourself in some way	◉	○	○	○



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Total Score: 5/27

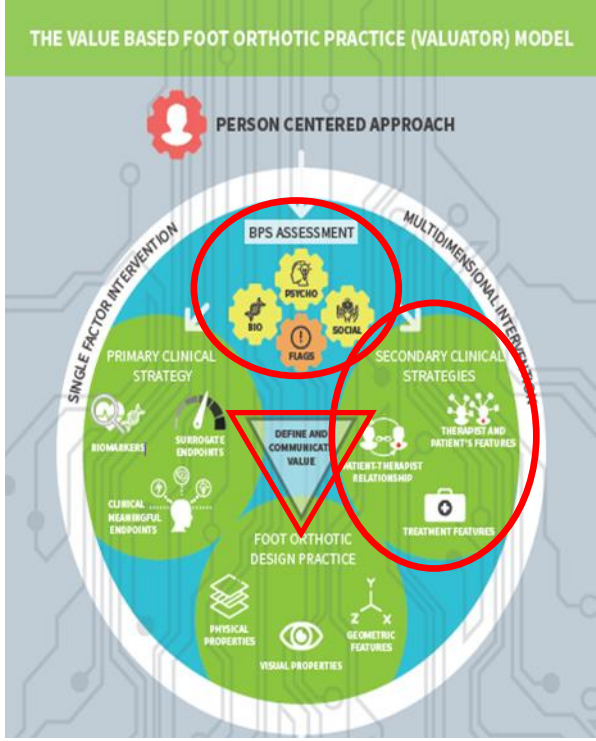
Low level of depression

03/07/2020

Patient Reported Measure about physical function

Foot and Ankle Ability Measure (FAAM) : Part 1

Because of your foot and ankle how much difficulty do you have with:	No difficulty	Slight difficulty	Moderate difficulty	Extreme difficulty	Unable to do	N/A
Standing	○	○	◉	○	○	○
Walking on even ground	○	○	◉	○	○	○
Walking on even ground without shoes	○	○	○	◉	○	○
Walking up hills	○	○	○	◉	○	○
Walking down hills	○	○	◉	○	○	○
Going up stairs	○	○	○	◉	○	○
Going down stairs	○	○	◉	○	○	○
Walking on uneven ground	○	○	○	◉	○	○
Stepping up and down curbs	○	○	◉	○	○	○
Squatting	○	○	◉	○	○	○
Coming up on your toes	○	○	◉	○	○	○
Walking initially	○	◉	○	○	○	○
Walking 5 minutes or less	○	◉	○	○	○	○
Walking approximately 10 minutes	○	○	◉	○	○	○
Walking 15 minutes or greater	○	○	○	◉	○	○



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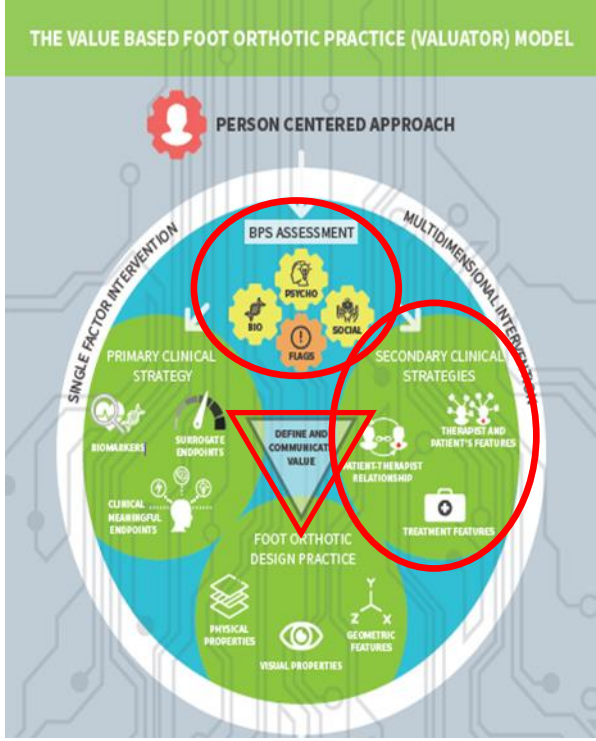
Patient Reported Measure about physical function



Foot and Ankle Ability Measure (FAAM) : Part 2

Because of your foot and ankle how much difficulty do you have with:	No difficulty	Slight difficulty	Moderate difficulty	Extreme difficulty	Unable to do	N/A
Home Responsibilities	○	◉	○	○	○	○
Activities of daily living	○	◉	○	○	○	○
Personal care	◉	○	○	○	○	○
Light to moderate work (standing, walking)	○	○	◉	○	○	○
Heavy work (push/pulling, climbing, carrying)	○	○	○	◉	○	○
Recreational activities	○	○	○	◉	○	○

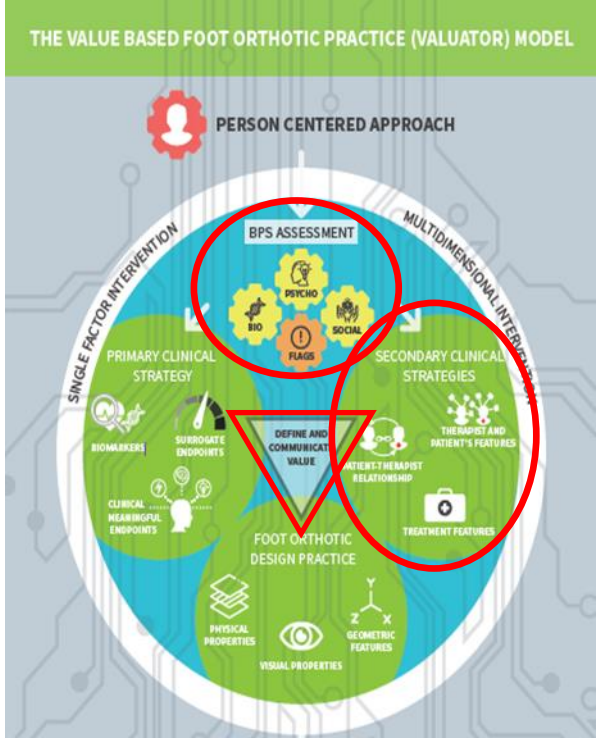
Electronic circuit in red!!

03/07/2020

Patient Reported Measure about physical function

Foot and Ankle Ability Measure (FAAM) : Part 3

Because of your foot and ankle how much difficulty do you have with:	No difficulty	Slight difficulty	Moderate difficulty	Extreme difficulty	Unable to do	N/A
Running	○	○	○	◉	○	○
Jumping	○	○	○	◉	○	○
Landing	○	○	○	◉	○	○
Starting and stopping quickly	○	○	○	◉	○	○
Cutting/lateral movements	○	○	○	◉	○	○
Low impact activities	○	◉	○	○	○	○
Ability to perform activity with your normal technique	○	○	◉	○	○	○
Ability to participate in your desired sport as long as you would like	○	○	○	○	◉	○



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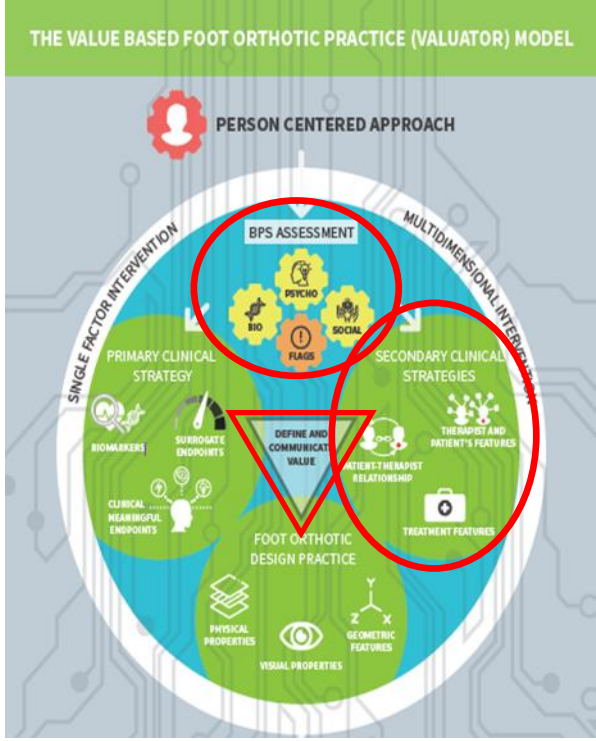
Patient Reported Measure about physical function



Foot and Ankle Ability Measure (FAAM) : Summary

Activities of Daily Living Scale	Sports Scale
48.8%	31.3%
Moderate level of physical functioning	Low level of physical functioning

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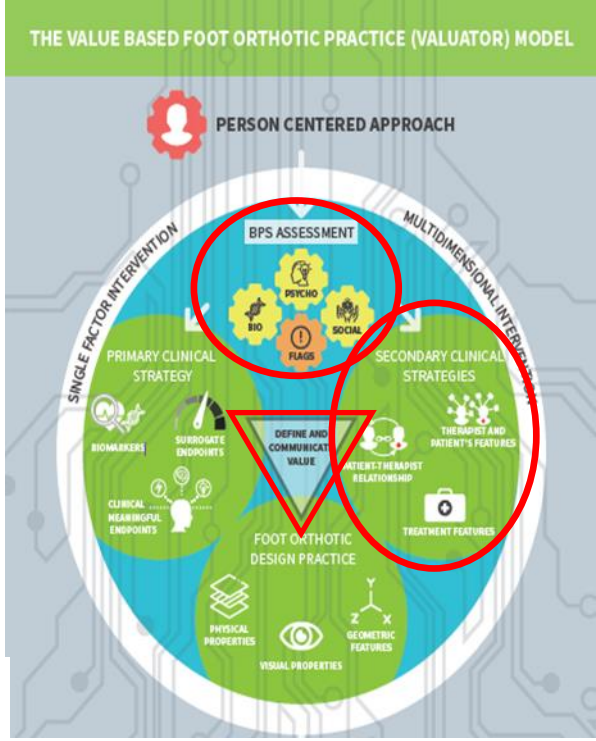
Patient Reported Measure about physical function



The Tampa Scale of Kinesiophobia (TSK) : Part 1

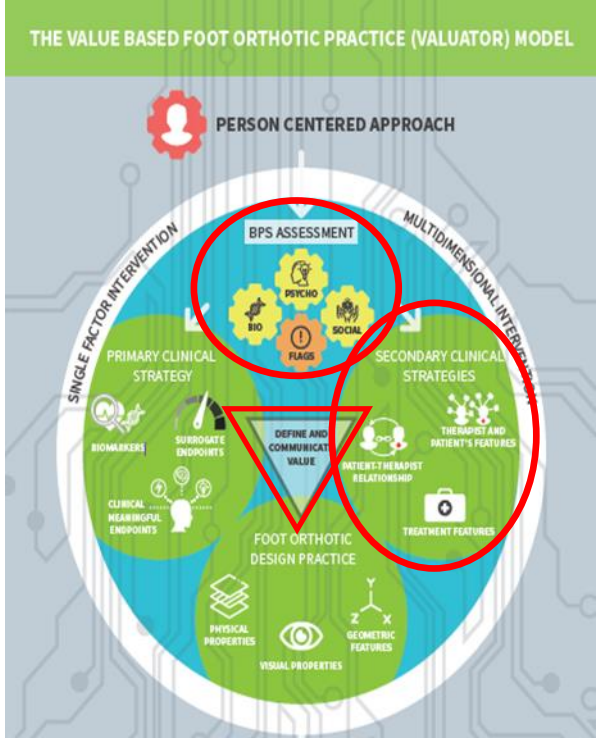
	Strongly disagree	Disagree	Agree	Strongly agree
I'm afraid that I might injury myself if I exercise	○	○	○	◉
If I were to try to overcome it, my pain would increase	○	○	◉	○
My body is telling me I have something dangerously wrong	○	○	◉	○
My pain would probably be relieved if I were to exercise	○	◉	○	○
People aren't taking my medical condition seriously enough	◉	○	○	○
My accident has put my body at risk for the rest of my life	○	○	◉	○
Pain always means I have injured my body	○	○	◉	○
Just because something aggravates my pain does not mean it is dangerous	○	◉	○	○
I am afraid that I might injure myself accidentally	○	○	◉	○

03/07/2020

Patient Reported Measure about physical function

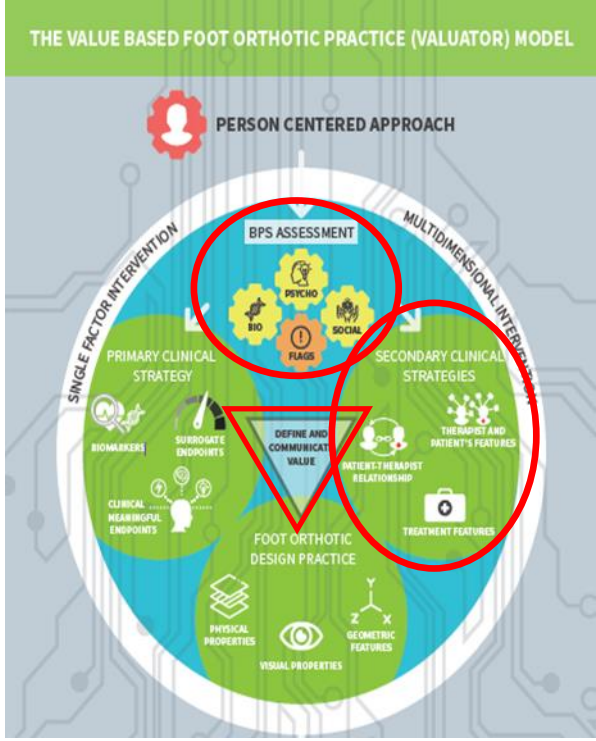
The Tampa Scale of Kinesiophobia (TSK) : Part 2

	Strongly disagree	Disagree	Agree	Strongly agree
Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening	○	○	◉	○
I wouldn't have this much pain if there weren't something potentially dangerous going on in my body	○	○	◉	○
Although my condition is painful, I would be better off if I were physically active	○	◉	○	○
Pain lets me know when to stop exercising so that I don't injure myself	○	○	◉	○
It's really not safe for a person with a condition like mine to be physically active	○	○	◉	○
I can't do all the things normal people do because it's too easy for me to get injured	◉	○	○	○
Even though something is causing me a lot of pain, I don't think it's actually dangerous	◉	○	○	○
No one should have to exercise when he/she is in pain	○	○	◉	○



Summary Score Tampa Scale of Kinesiophobia
43/68
Considerable fear of movement

Patient Reported Measure about physical function



The Effort-Reward Imbalance Model (ERI): Part 1

	Strongly disagree	Disagree	Agree	Strongly agree
ERI1 - I have constant time pressure due to a heavy work load	○	○	◉	○
ERI2 - I have many interruptions and disturbances while performing my job.	○	○	◉	○
ERI3 - Over the past few years, my job has become more and more demanding.	○	○	◉	○
ERI4 - I receive the respect I deserve from my superior or a respective relevant person.	○	○	◉	○
ERI5 - My job promotion prospects are poor.	○	○	◉	○
ERI6 - I have experienced or I expect to experience an undesirable change in my work situation.	○	○	○	◉
ERI7 - My job security is poor.	○	○	◉	○
ERI8 - Considering all my efforts and achievements, I receive the respect and prestige I deserve at work.	○	○	◉	○
ERI9 - Considering all my efforts and achievements, my job promotion prospects are adequate.	○	◉	○	○
ERI10 - Considering all my efforts and achievements, my salary / income is adequate.	○	○	◉	○

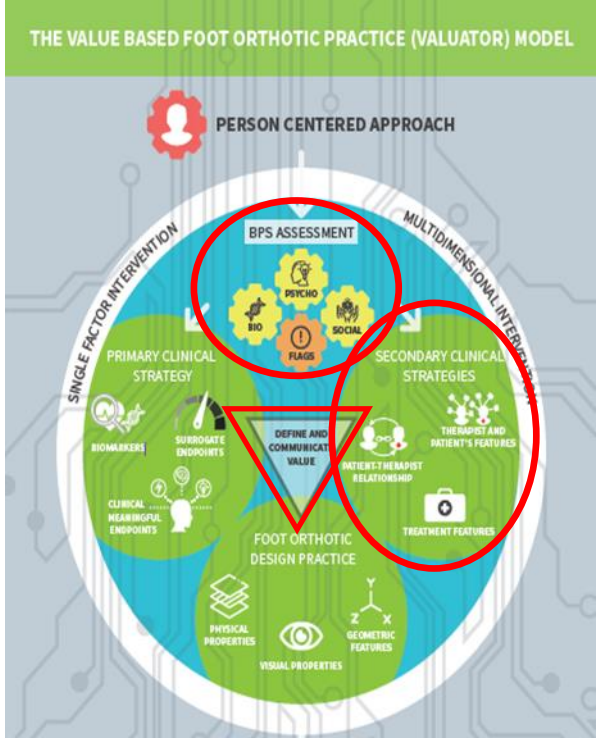
03/07/2020

Patient Reported Measure about physical function

The Effort-Reward Imbalance Model (ERI): Part 2

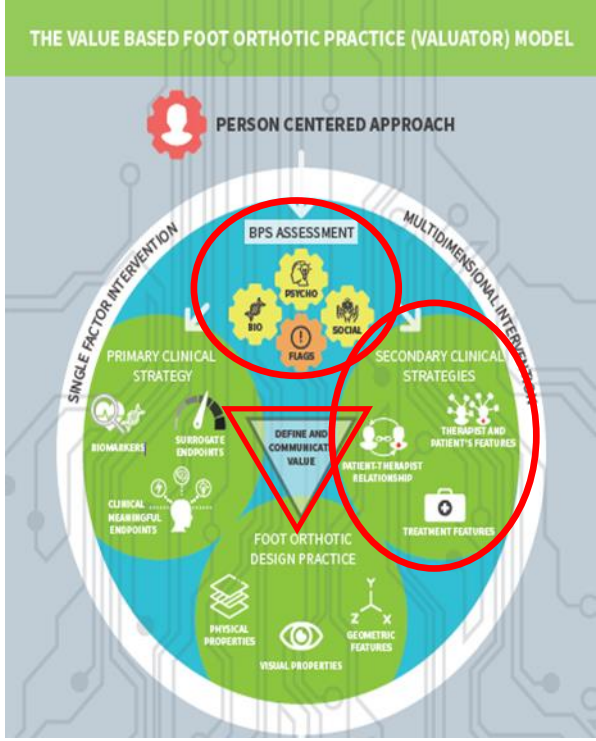
	Strongly disagree	Disagree	Agree	Strongly agree
OC1 - I get easily overwhelmed by time pressures at work.	○	◉	○	○
OC2 - As soon as I get up in the morning I start thinking about work problems.	○	○	◉	○
OC3 - When I get home, I can easily relax and 'switch off' work.	○	○	◉	○
OC4 - People close to me say I sacrifice too much for my job.	○	◉	○	○
OC5 - Work rarely lets me go, it is still on my mind when I go to bed.	○	◉	○	○
OC6 - If I postpone something that I was supposed to do today I'll have trouble sleeping at night.	○	◉	○	○

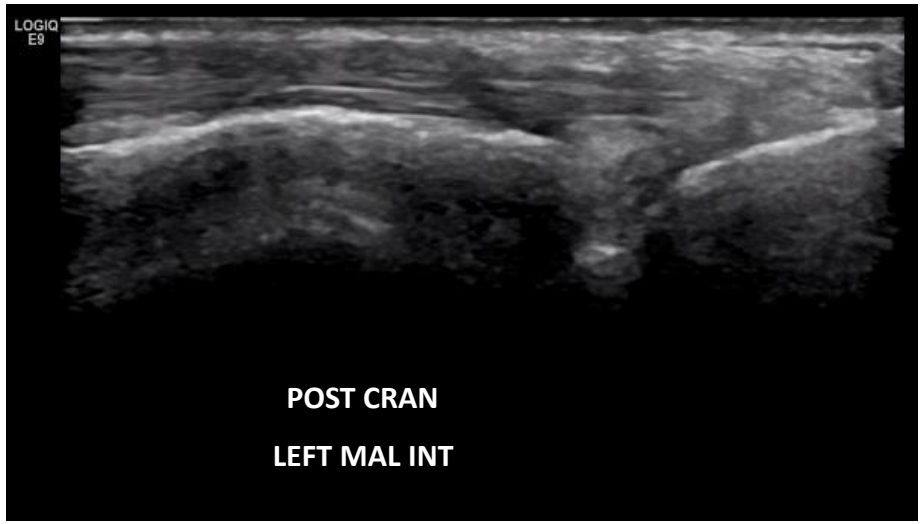
Effort Scale	Reward Scale	Overcommitment Scale
9/12	16/28	13/24
High efforts	Moderate Rewarding	Moderate commitment



Medical imaging

- Clinical findings of the patient were considered to conform to posterior tibial tendon dysfunction and an ultrasound was carried out.





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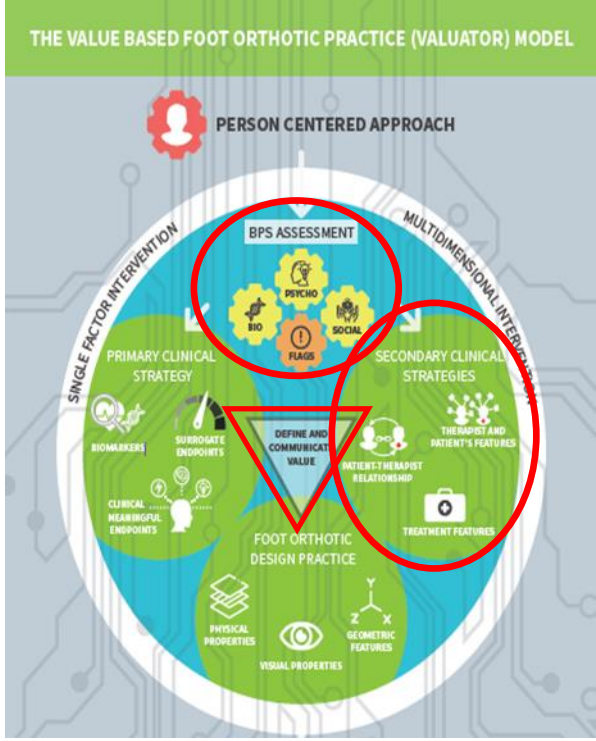

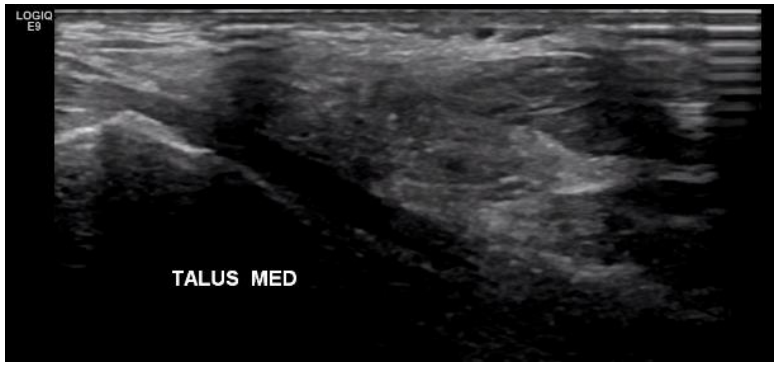

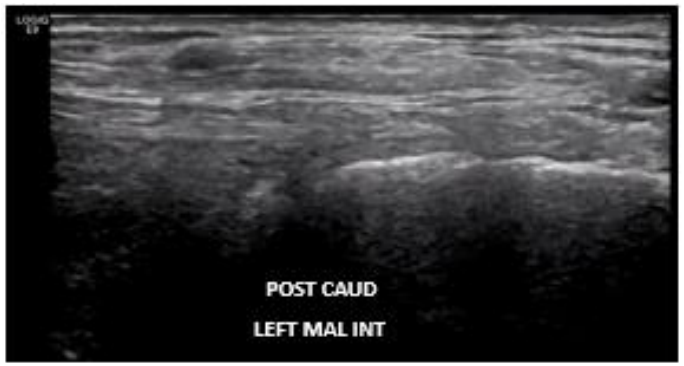

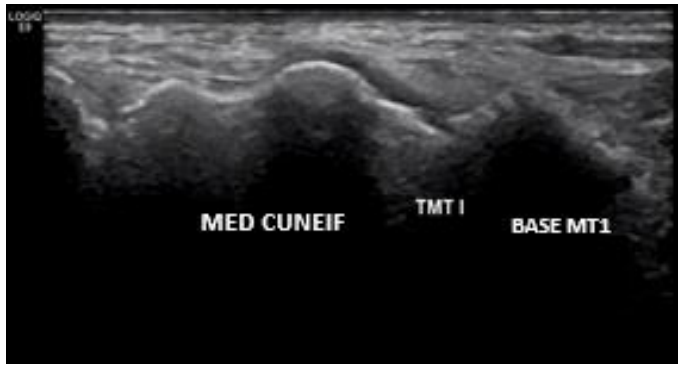

Medical imaging

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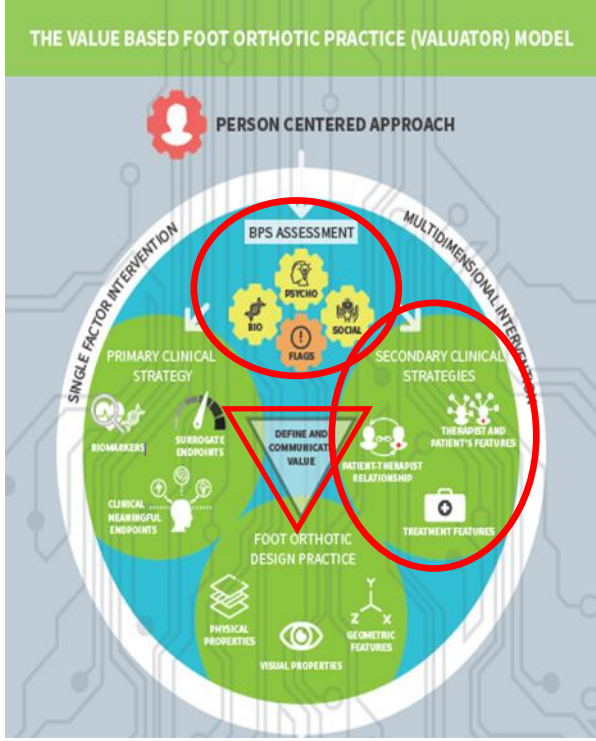
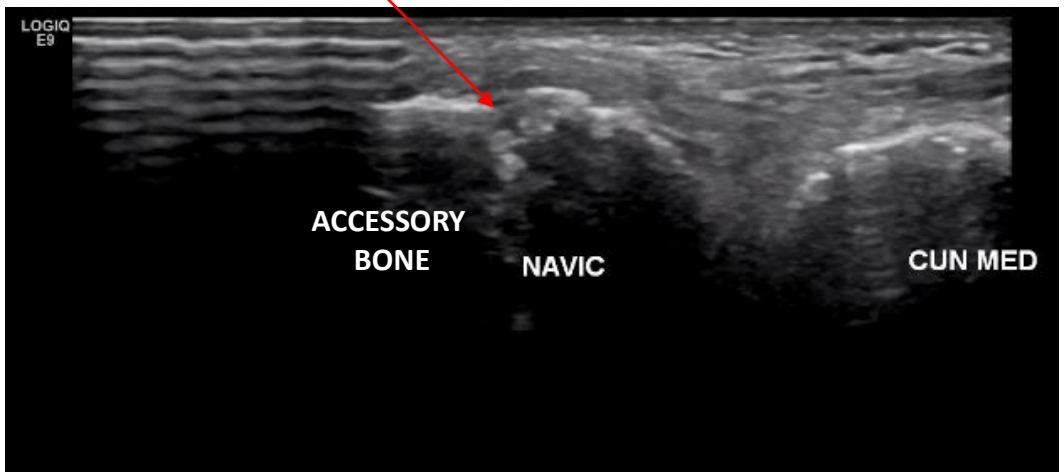
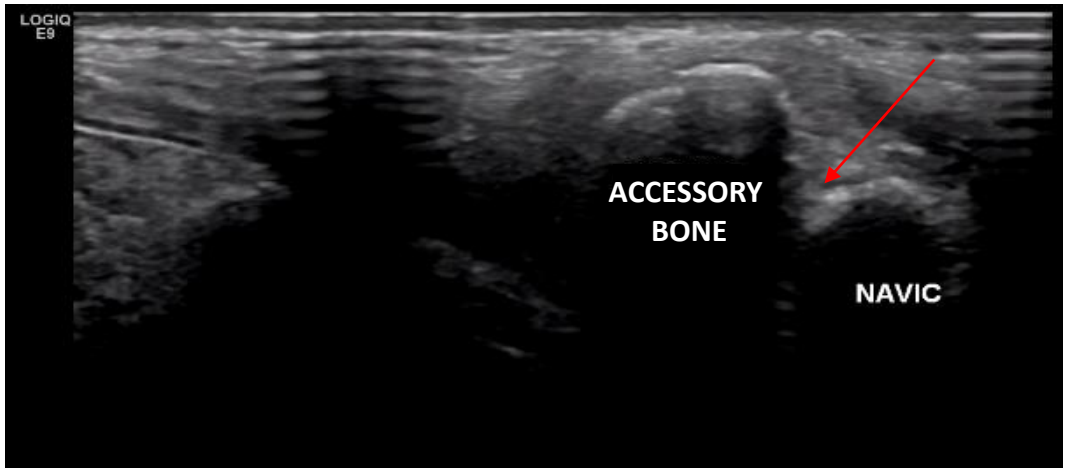
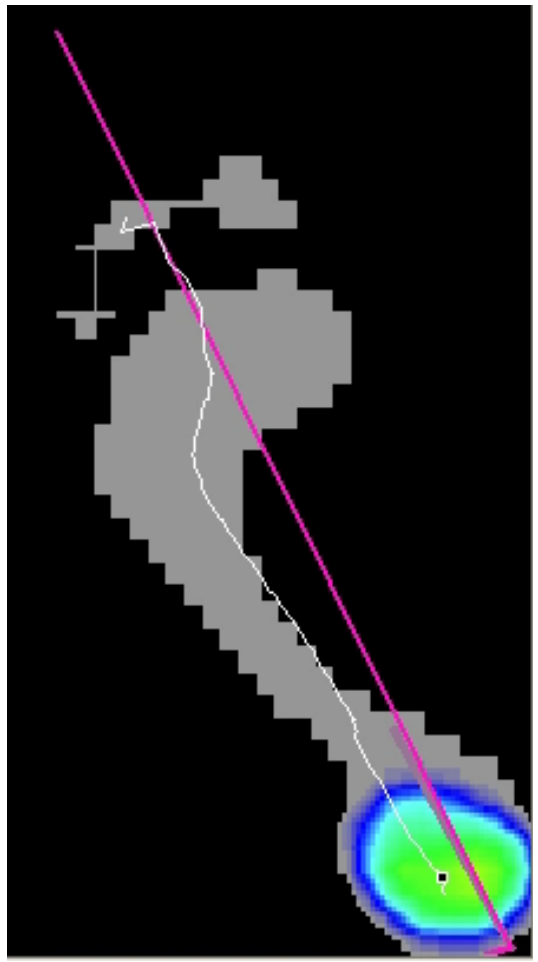
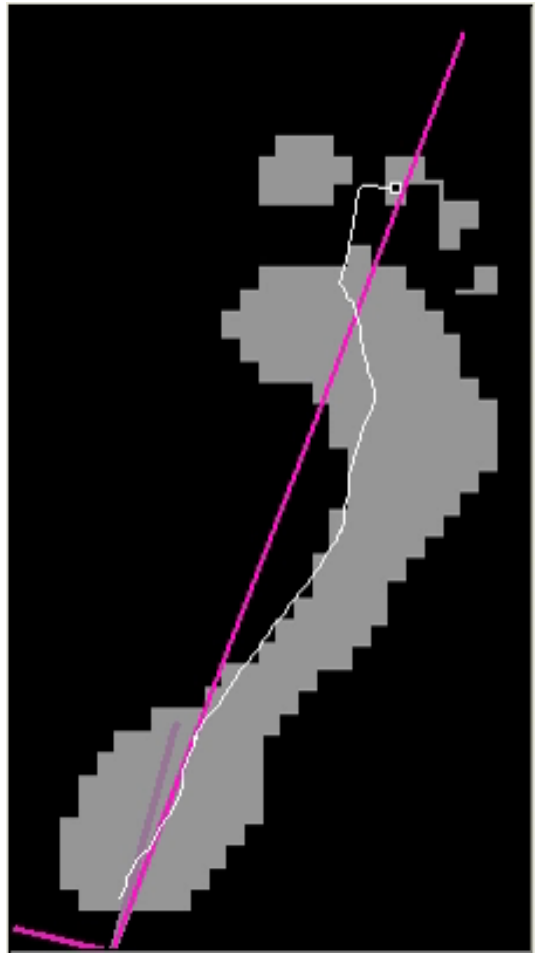


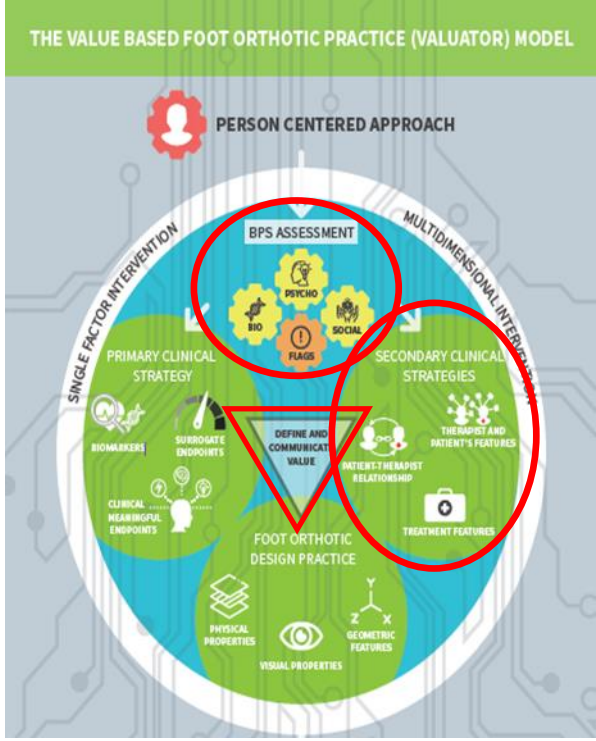




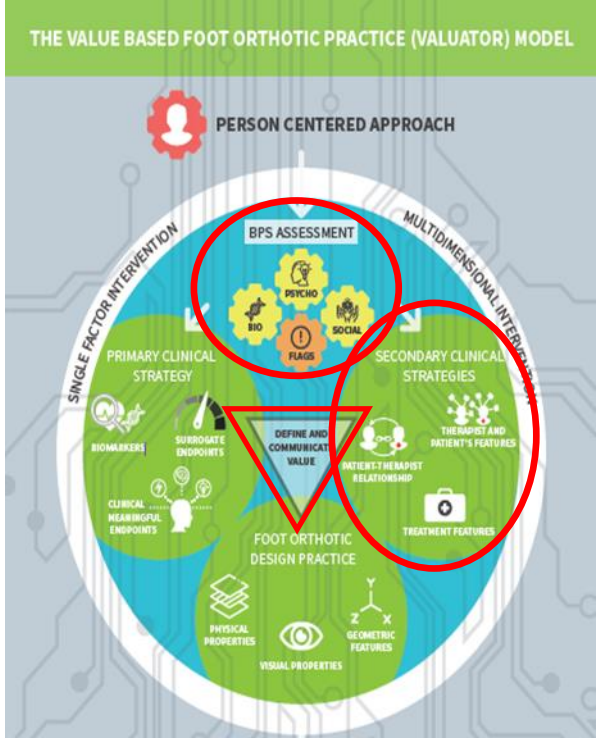
Gait analysis: Plantar pressure measurement







Gait analysis: 2D video-analysis



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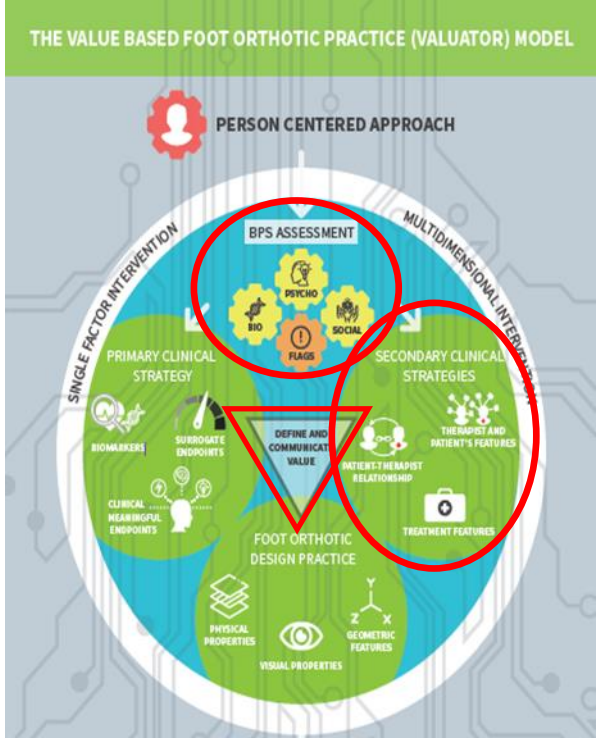
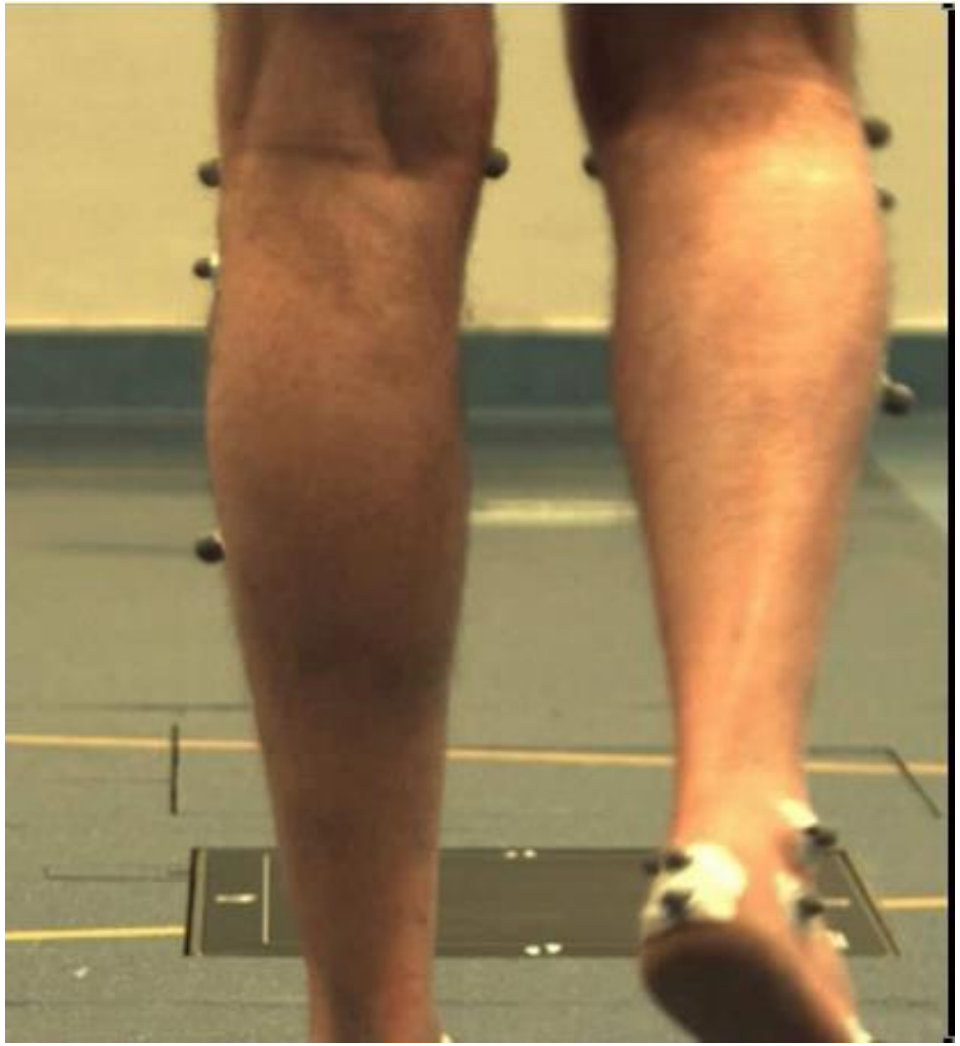
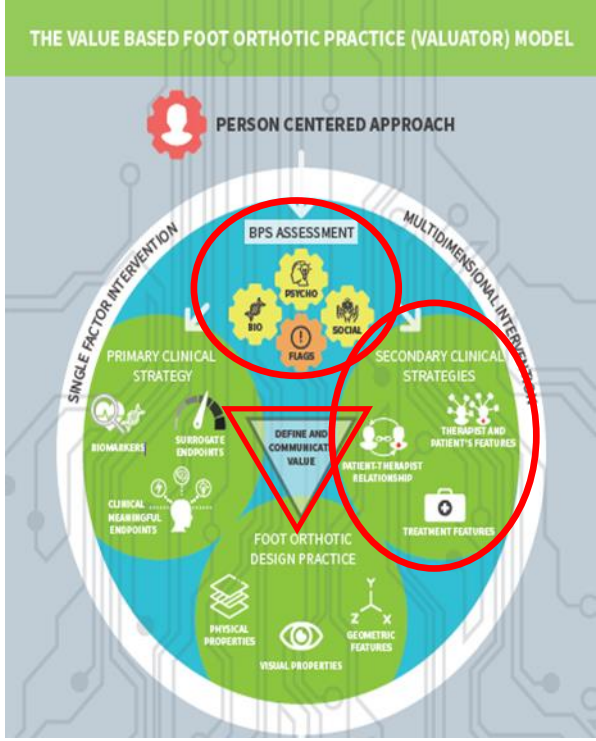


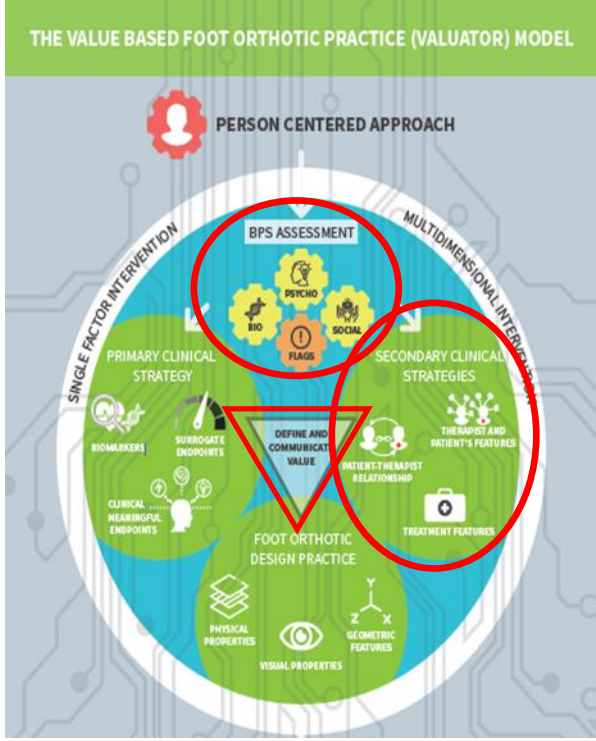
Gait analysis: 2D video-analysis





17/07/2020

Gait analysis:
3D Multi-segment Foot Model



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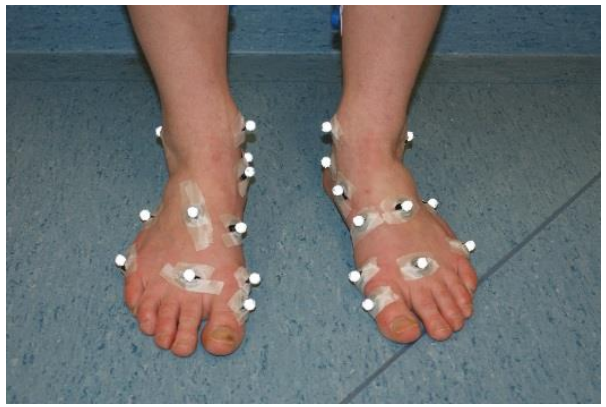
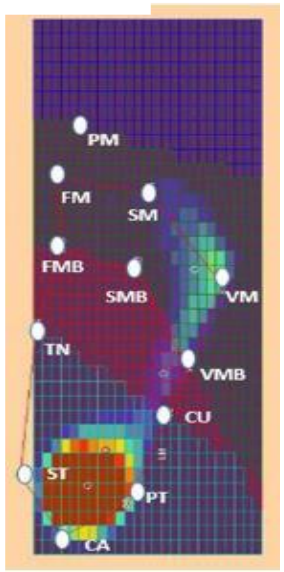
Estimation of foot joint kinetics in three and four segment foot models using an existing proportionality scheme: Application in paediatric barefoot walking

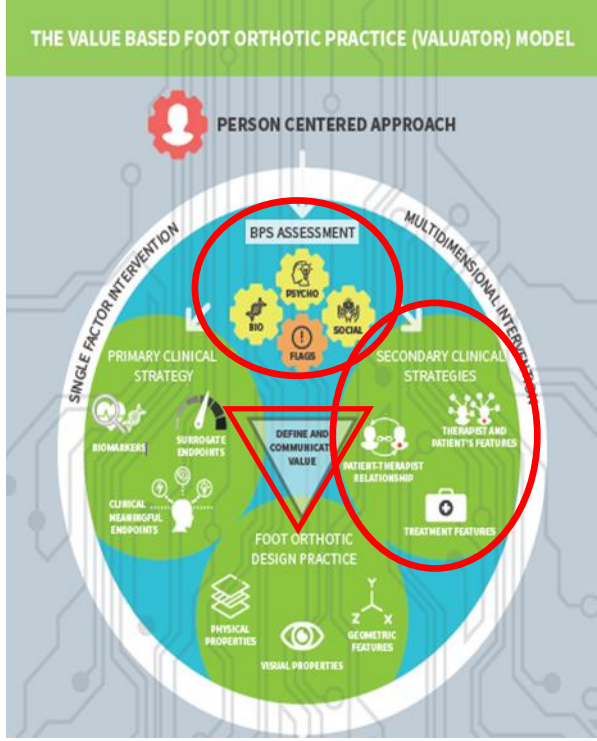
Kevin Deschamps[a,b,c,*], Maarten Eerdekens[d], Dirk Desmet[d], Giovanni Arnoldo Matricali[e], Sander Wuite[e], Filip Staes[a,1]





17/07/2020

Gait analysis:
3D Multi-segment Foot Model

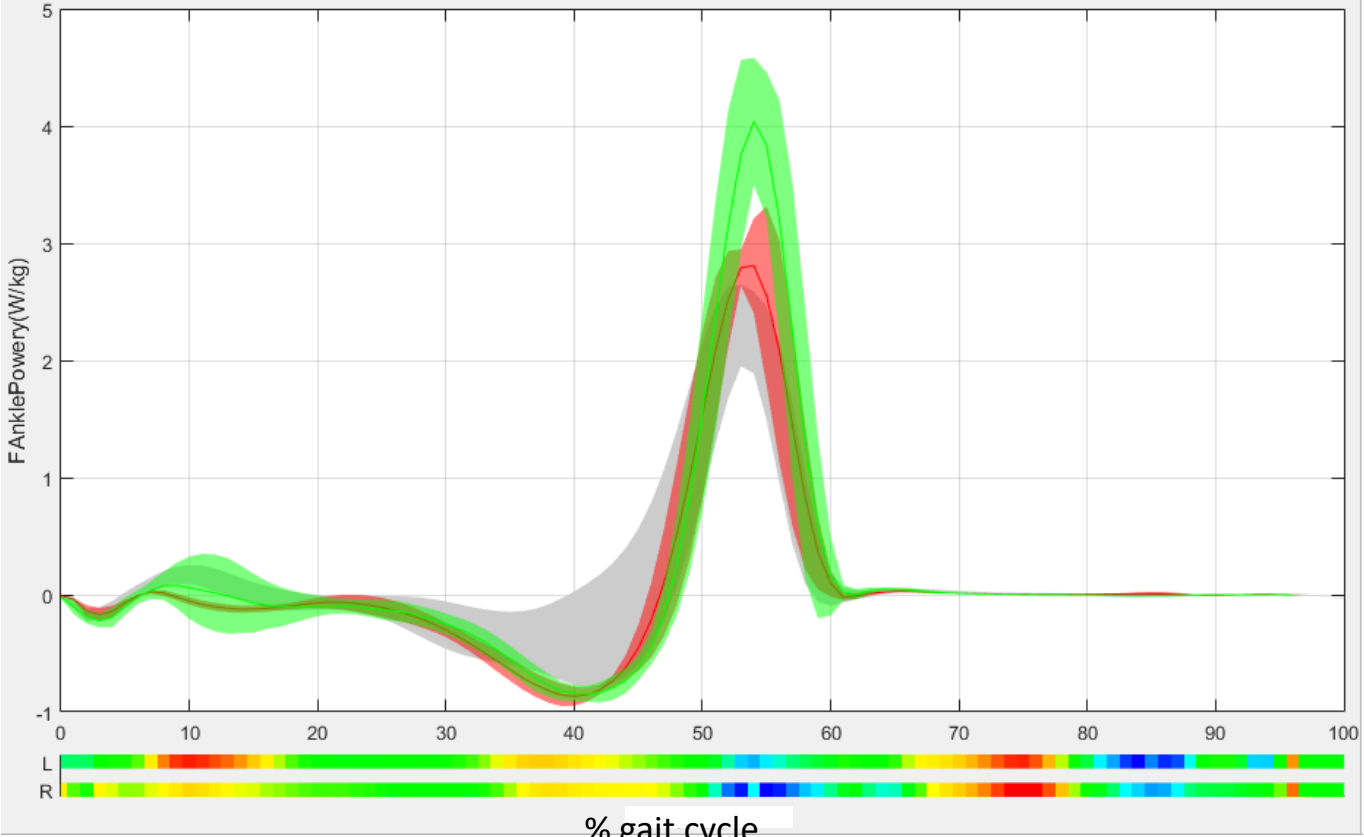


Reference data (asymptomatic subjects)

Right Foot

Left Foot

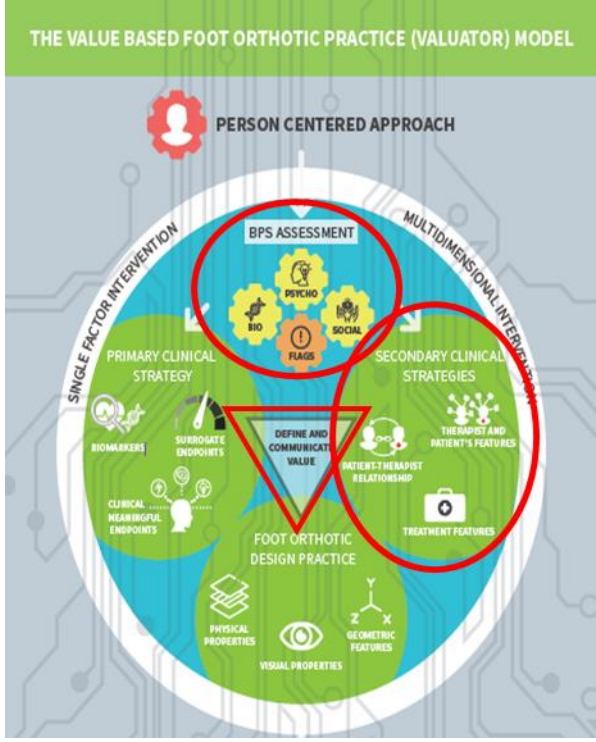
Ankle Power



Parameter	Reference data	Left foot	Right foot
Peak Power generation (W/kg)	2.47	3.0	4.1
Peak Power Absorption (W/kg)	-0.62	-0.86	-0.87

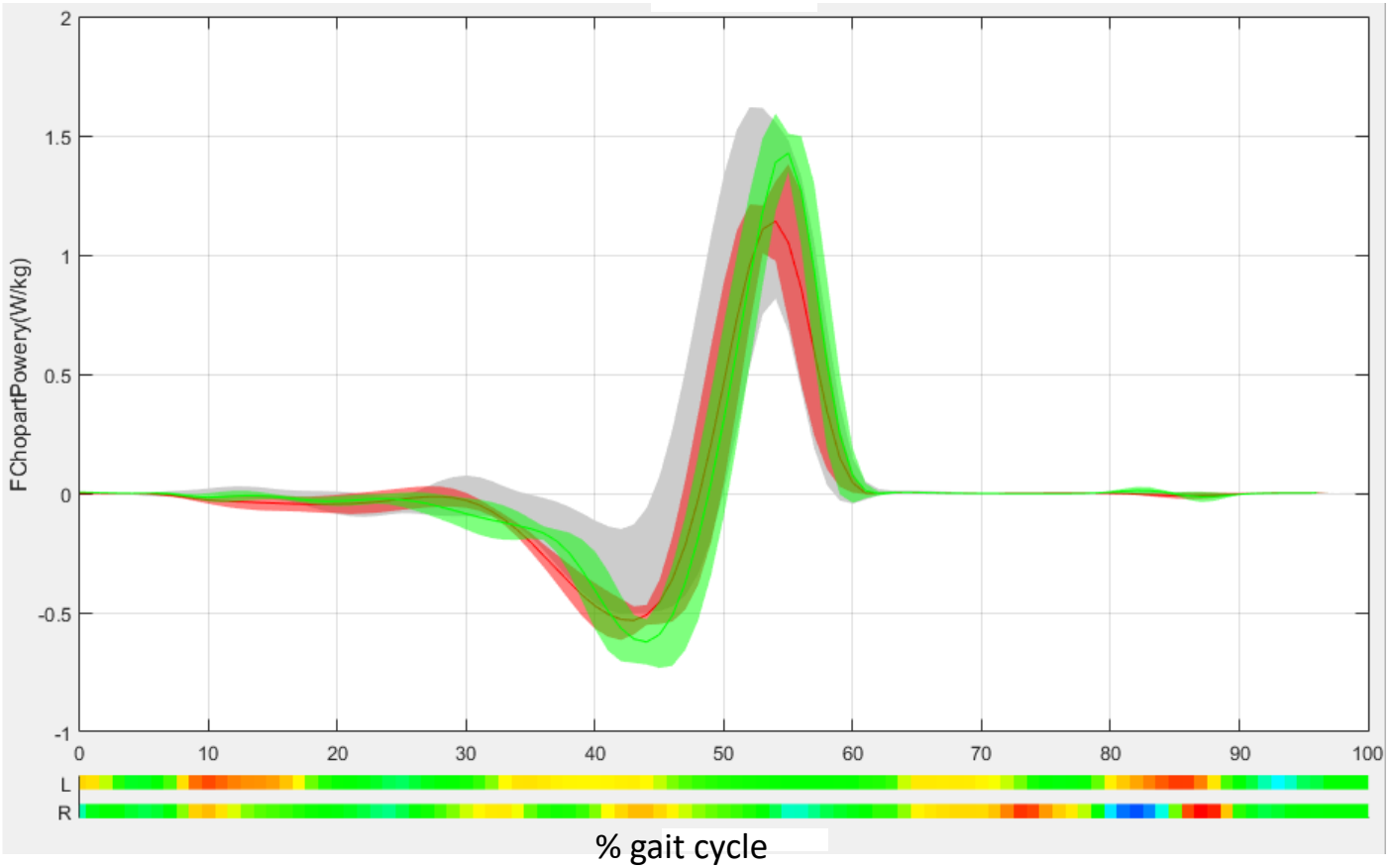
17/07/2020

Gait analysis:
3D Multi-segment Foot Model



Reference data (asymptomatic subjects)
Right Foot
Left Foot

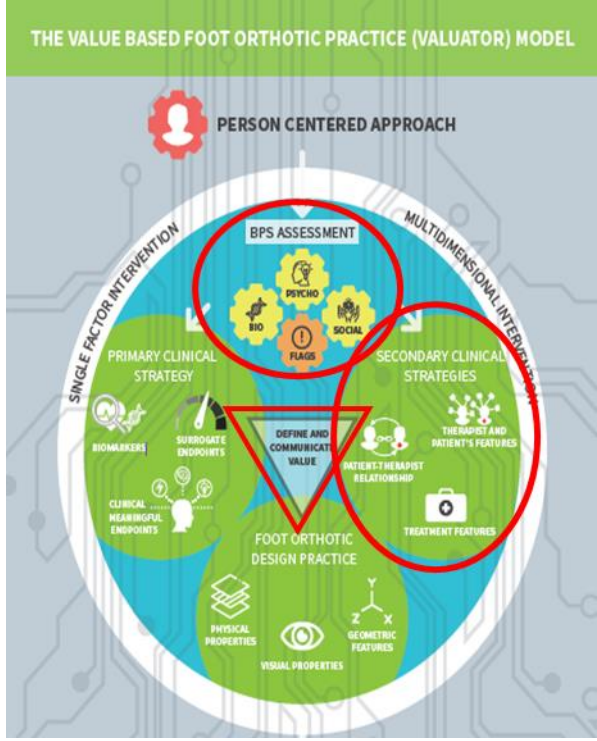
Chopart Power



Parameter	Reference data	Left foot	Right foot
Peak Power generation (W/kg)	1.42	1.25	1.5
Peak Power Absorption (W/kg)	-0.41	-0.54	-0.67

17/07/2020

Gait analysis:
3D Multi-segment Foot Model

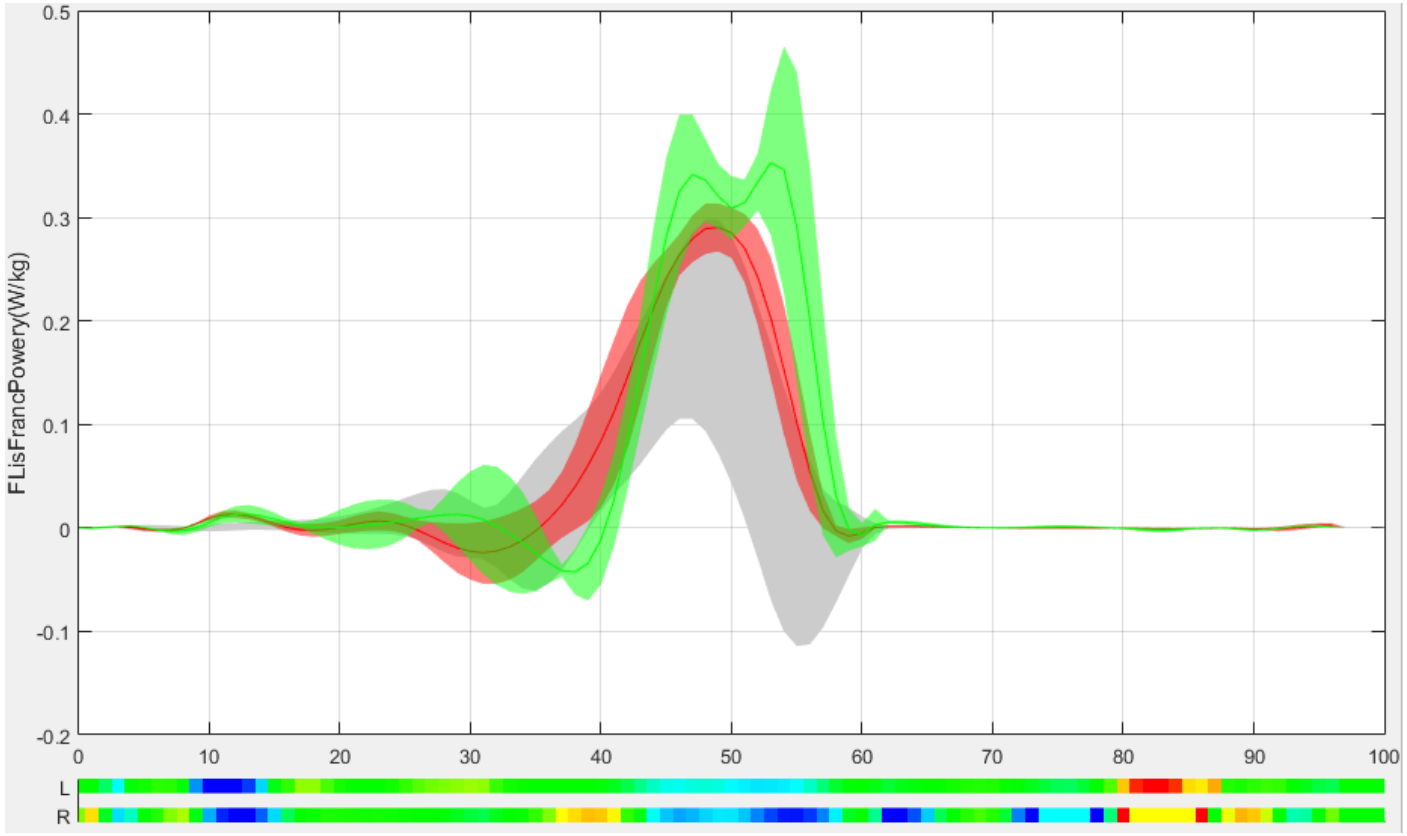


Reference data (asymptomatic subjects)

Right Foot

Left Foot

Lisfranc Power



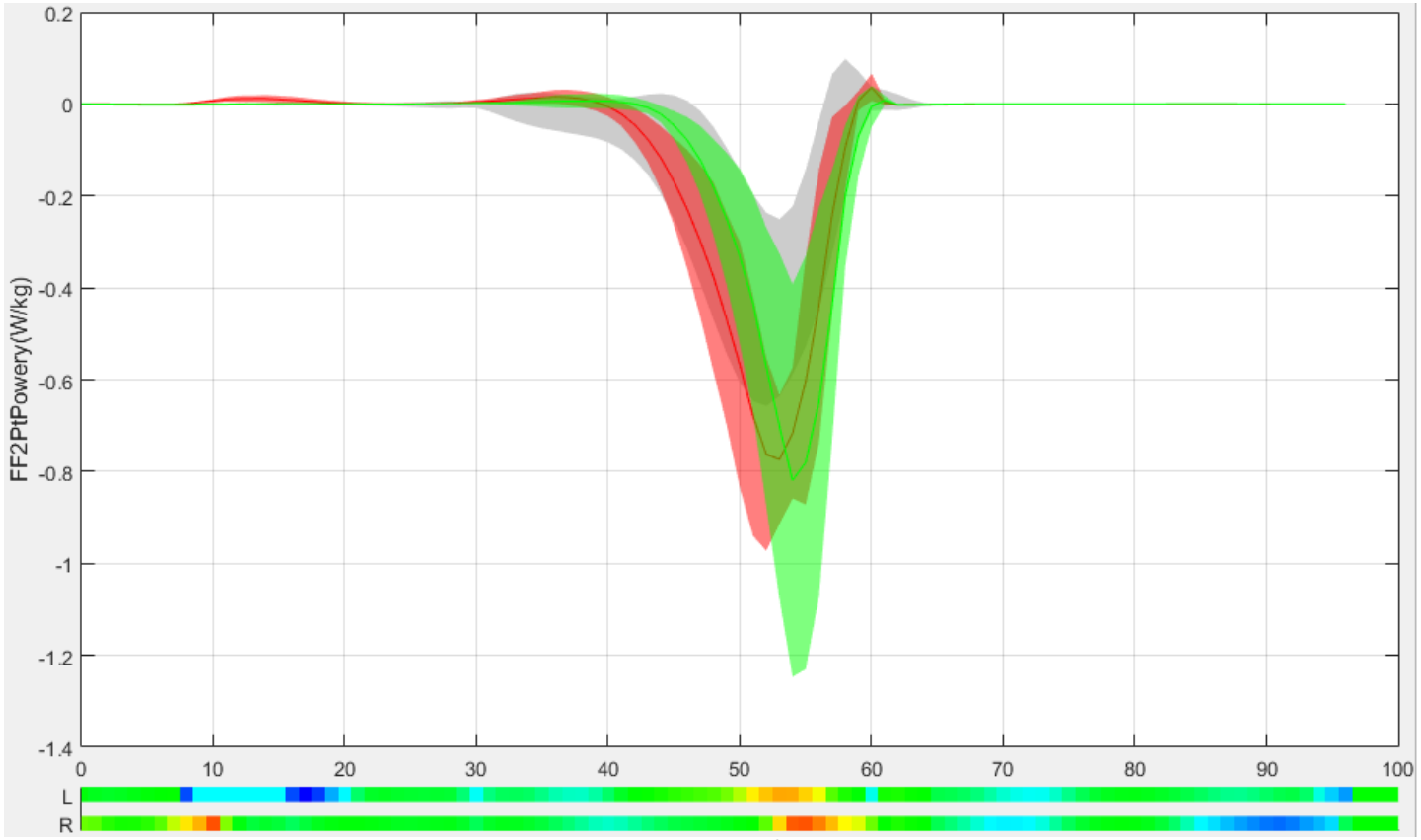
Parameter	Reference data	Left foot	Right foot
Peak Power generation (W/kg)	0.23	0.29	0.39
Peak Power Absorption (W/kg)	-0.07	-0.03	-0.05

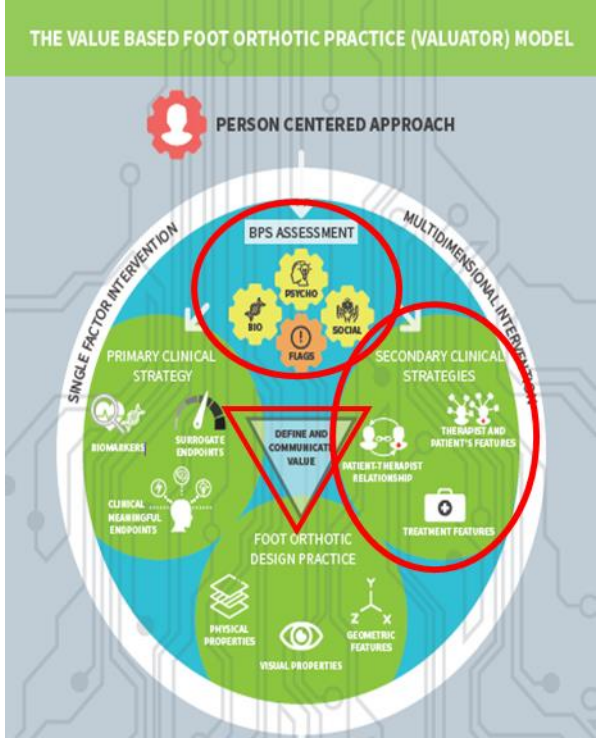
17/07/2020

Gait analysis:
3D Multi-segment Foot Model

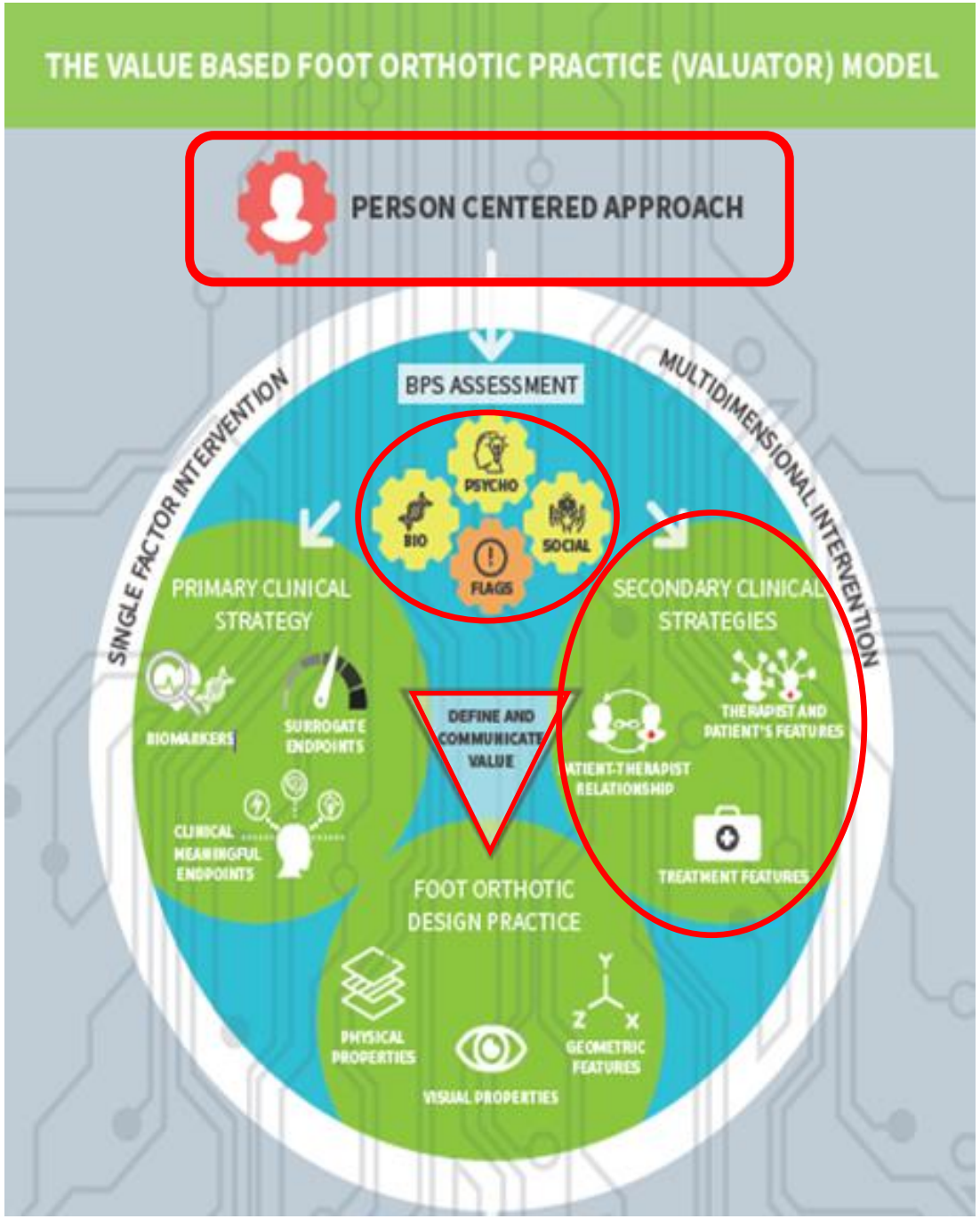
Reference data (asymptomatic subjects)
Right Foot
Left Foot

Hallux Power





Parameter	Reference data	Left foot	Right foot
Peak Power generation (W/kg)	0.64	0.50	0.019
Peak Power Absorption (W/kg)	-0.51	-0.84	-0.86


THE VALUE BASED FOOT ORTHOTIC PRACTICE (VALUATOR) MODEL
PERSON CENTERED APPROACH
BPS ASSESSMENT
PSYCHO
BIO
SOCIAL
FLAGS
SINGLE FACTOR INTERVENTION
MULTIDIMENSIONAL INTERVENTION
PRIMARY CLINICAL STRATEGY
BIOMARKERS
SURROGATE ENDPOINTS
CLINICAL MEANINGFUL ENDPOINTS
DEFINE AND COMMUNICATE VALUE
SECONDARY CLINICAL STRATEGIES
THERAPIST AND PATIENT'S FEATURES
PATIENT-THERAPIST RELATIONSHIP
TREATMENT FEATURES
FOOT ORTHOTIC DESIGN PRACTICE
PHYSICAL PROPERTIES
VISUAL PROPERTIES
GEOMETRIC FEATURES
Y
Z
X


Feedback

Diagnosis

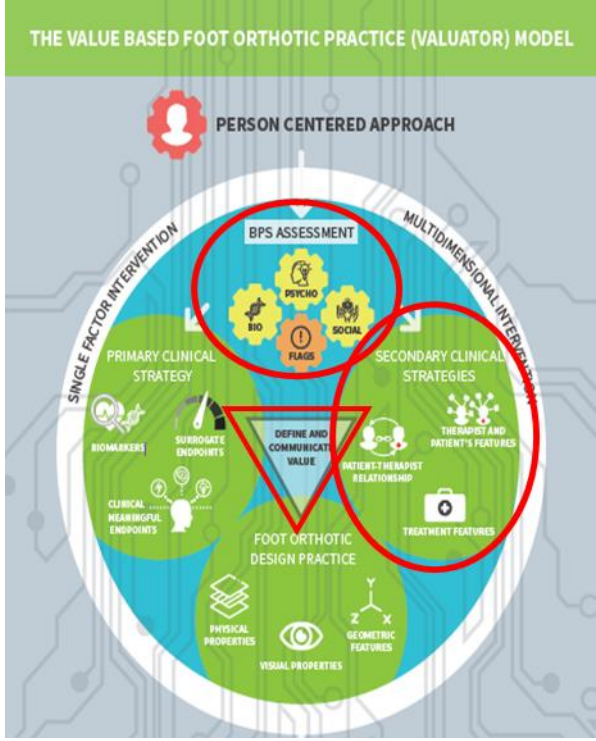
- Based and the clinical findings the patient was diagnosed with Stage I posterior tibial tendon dysfunction (PTTD)

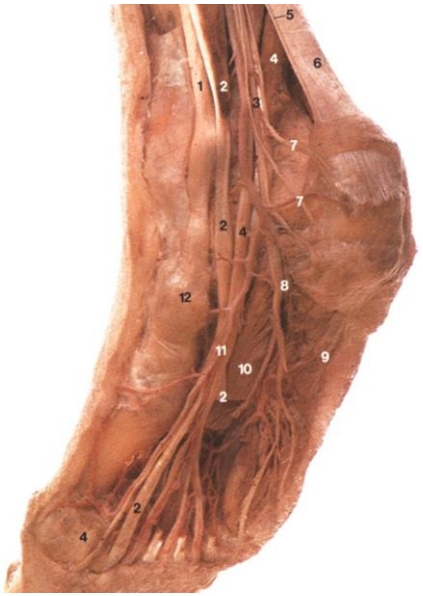
TABLE 1. Changes Associated With Various Stages of TPT Dysfunction

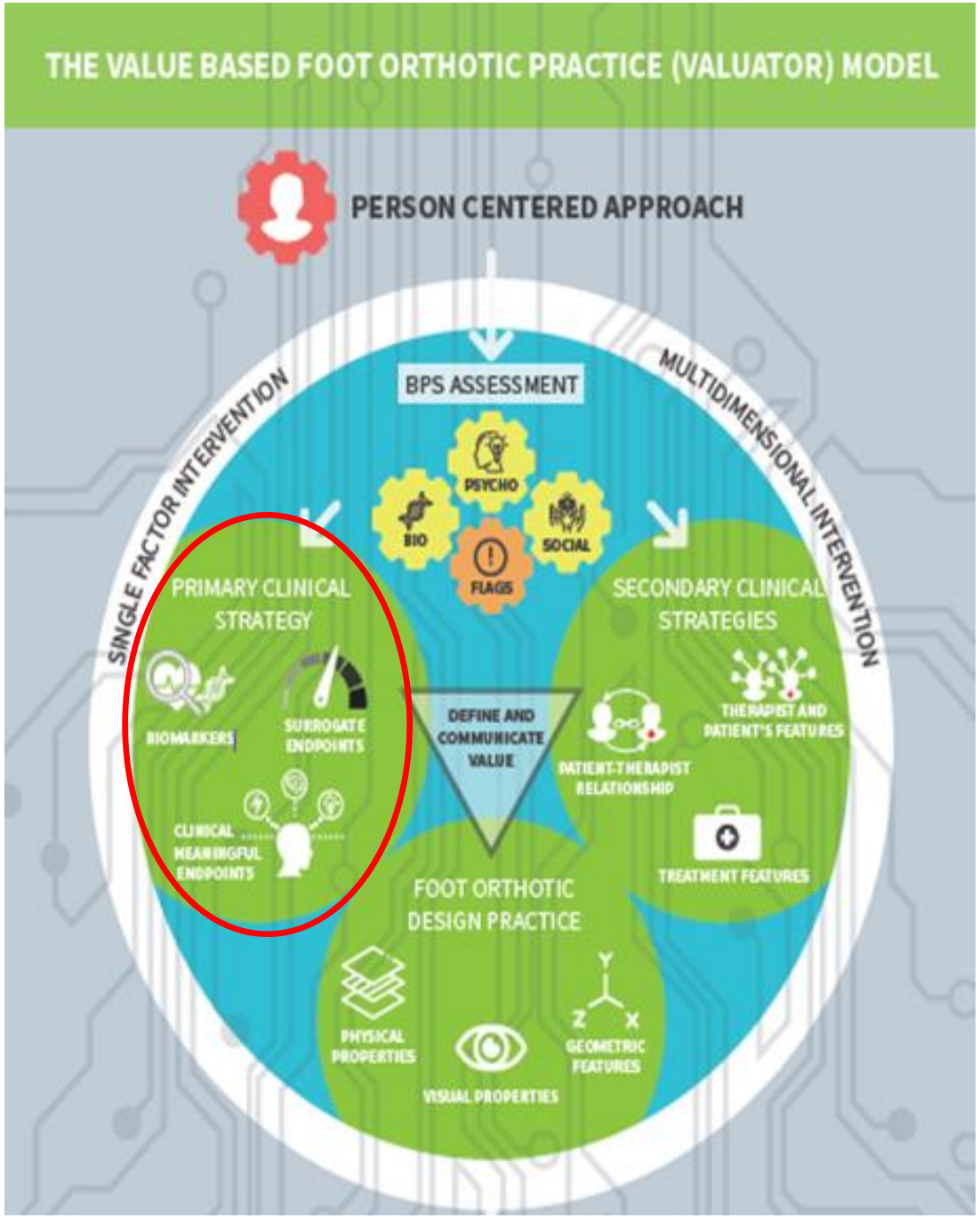
	Stage 1	*Stage 2*	*Stage 3*
TPT condition	Peritendinitis and/or tendon degeneration	Elongation	Elongation
Hindfoot	Mobile, normal alignment	Mobile, valgus position	Fixed, valgus position
Pain	Medial: focal, mild to moderate	Medial: along TPT, moderate	Medial: possibly lateral, moderate
Single-heel-rise test	Mild weakness	Marked weakness	Marked weakness
"Too-many-toes" sign with forefoot abduction	Normal	Positive	Positive
Pathology	Synovial proliferation, degeneration	Marked degeneration	Marked degeneration
Treatment	Conservative, 3 months; surgical, 3 months with synovectomy, tendon debridement, rest	Transfer FDL* for TPT	Subtalar arthrodesis

* Flexor digitorum longus.

Johnson et al 1989



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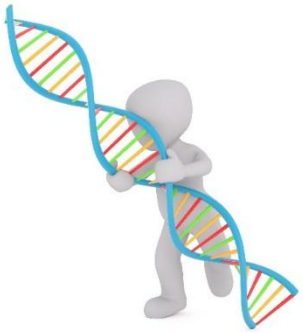
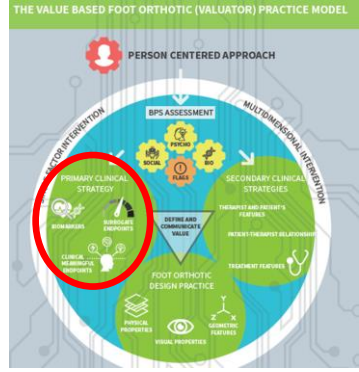
Primary Clinical Strategy



Clinical meaningful endpoints highlighted by the patient



Clinical meaningful endpoint reported by patient	Short and mid-term goals	Long-term goals	Clinical Measure
Pain-discomfort in daily activities	x		FAAM (Daily Activity scale) + VAS
Increased work related stress due to foot pain	x		FAAM (Daily Activity Scale) + ERI scale
Kinesiophobia	x		TSK
Reduced running activities		x	FAAM (Sports scale)
Increased bodyweight		x	Scale

04/08/2020

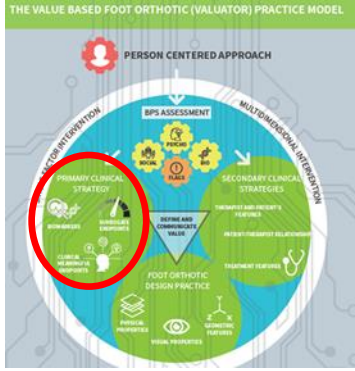
Primary clinical strategies of the therapist

Therapist perspective

CME: Clinical Meaningful Endpoints
SE: Surrogate endpoint

Endpoint reported by therapist	Short and mid-term goals	Long-term goals	Measure
Hypertension	x		Biomarker: Blood pressure
Pain-discomfort during daily activities and at work	x		CME: VAS+ FAAM (Daily Activity Scale) + ERI scale
Avoid progression towards stage II PTTD	x		Biomarker: Ultrasound
Maintain muscle strength tibialis posterior muscle	x		SE Level 3: Unipodal Single Heel Rise Test
Regain midfoot stability	x		SE Level 2: Chopart Power Absorption SE Level 3: 2D video-analysis & plantar pressure measurement
Kinesiophobia	x		CME: FAAM and TSK

04/08/2020

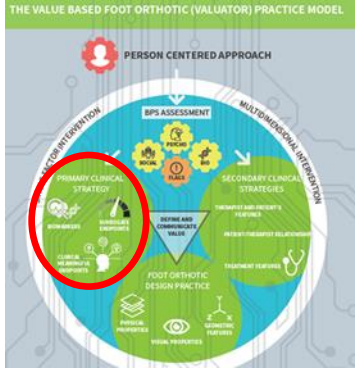


Therapist perspective

CME: Clinical Meaningful Endpoints
SE: Surrogate endpoint

Endpoint reported by therapist	Short and mid-term goals	Long-term goals	Measure
Reduced running activities		x	CME: FAAM (Sports scale)
Increased bodyweight		x	CME: Scale

Multidimensional approach



- Referral to general practitioner: follow-up of hypertension, since atherosclerosis and high blood pressure may cause accumulation of cholesterol within tendons and joints, causing inflammation and pain of the tendon.

- Physical therapy:
  - Local anti-inflammatory treatment
  - Posterior tibial tendon muscle strengthening
  - Foot core exercices
  - Optimisation neuro-motor control lumbopelvic region
  - Education- and quota-based exercise physical therapy program as management of kinesiophobia

THE VALUE BASED FOOT ORTHOTIC PRACTICE (VALUATOR) MODEL

THE VALUE BASED FOOT ORTHOTIC PRACTICE (VALUATOR) MODEL

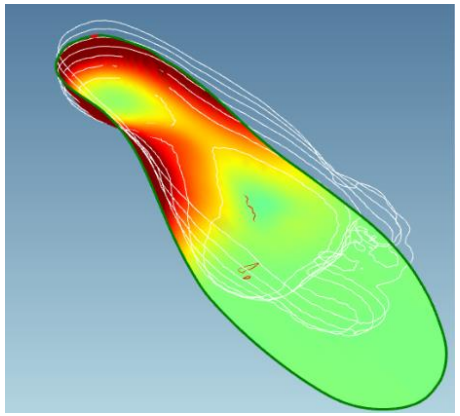
https://cy.rsdelivers.com/

FOOT ORTHOTIC DESIGN PRACTICE

PHYSICAL PROPERTIES

VISUAL PROPERTIES

GEOMETRIC FEATURES



Endpoint reported by therapist	Short and mid-term goals	Primary Clinical Strategy	Secondary Clinical Strategy
Pain-discomfort during daily activities and at work	x		
Avoid progression towards stage II PTTD	x		
Maintain muscle strength	x		
Regain midfoot stability	x		
Kinesiophobia	x		