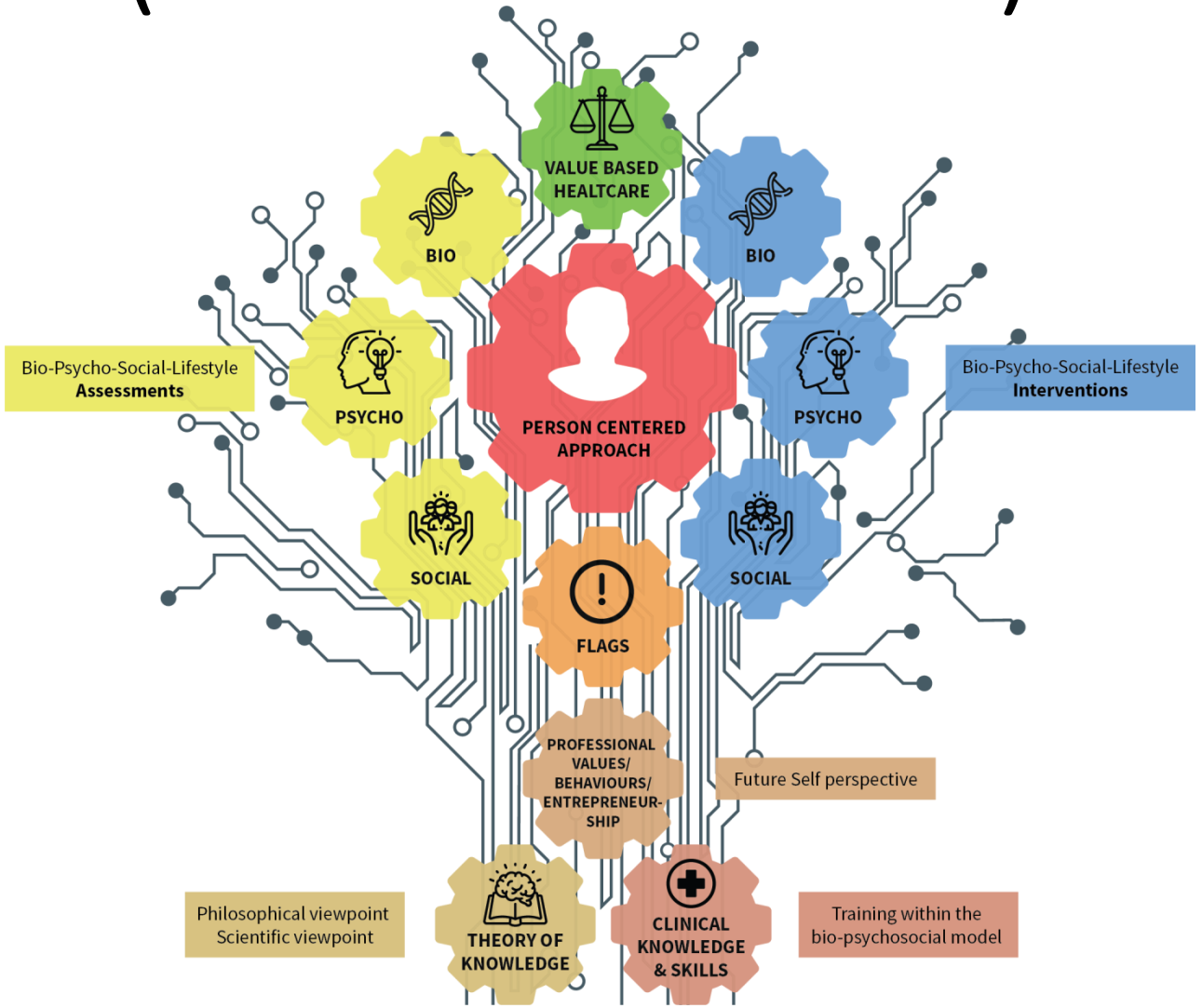
This case study has been developed for non-commercial, teaching purposes.

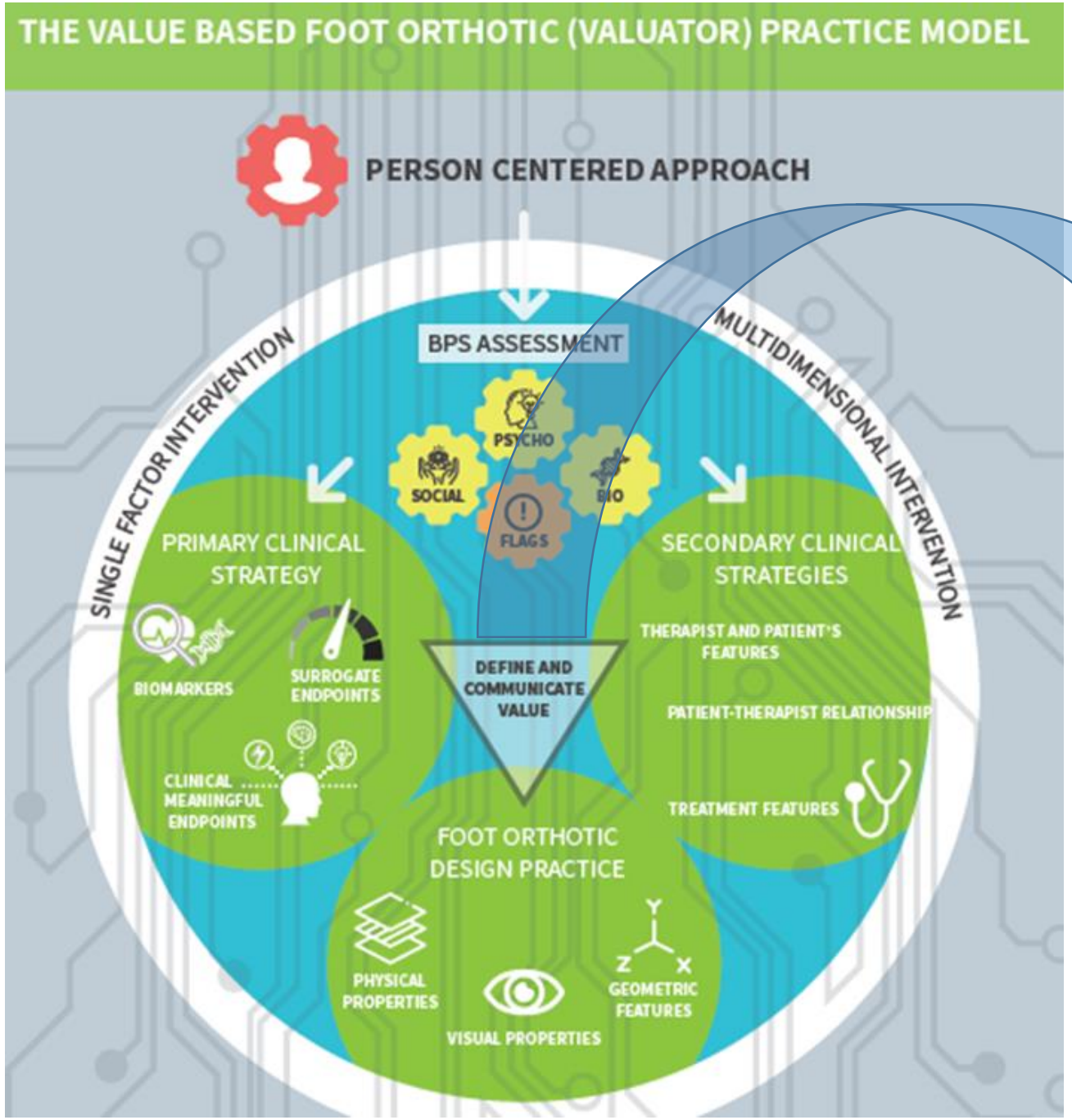
Questions/remarks can be forwarded to

gagijon@uma.es

The ValuE BaseD DIgiTal FOot CaRe Framework (EDITOR FRAMEWORK)



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


THE VALUE BASED FOOT ORTHOTIC (VALUATOR) PRACTICE MODEL
PERSON CENTERED APPROACH
BPS ASSESSMENT
PSYCHO
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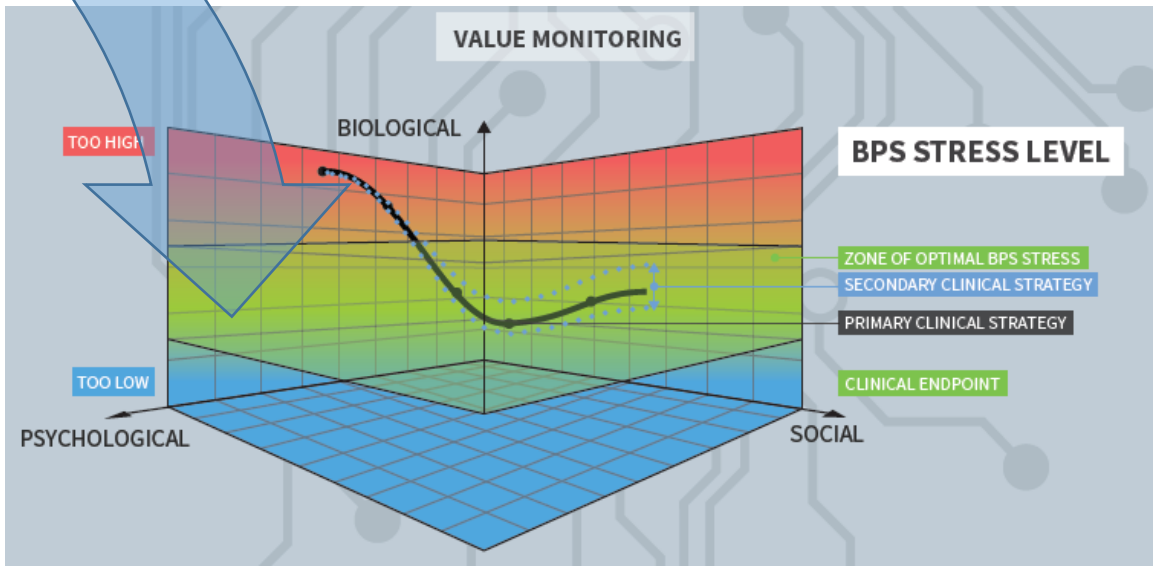
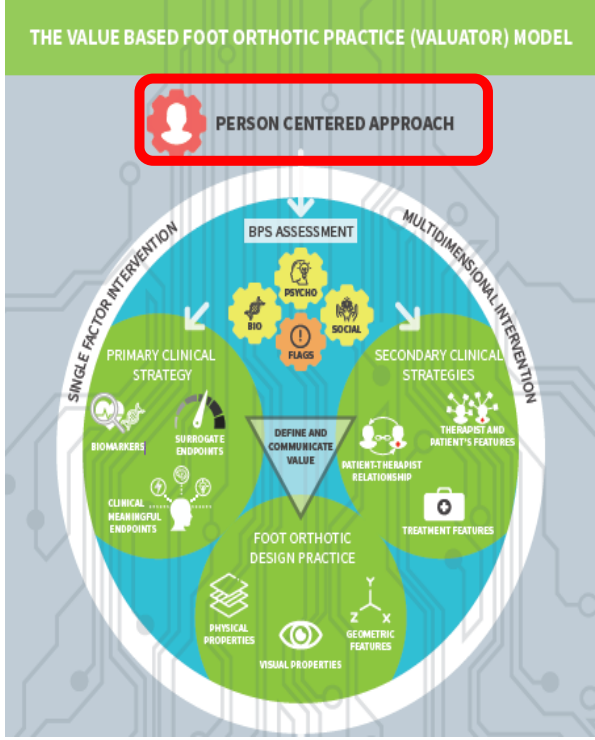
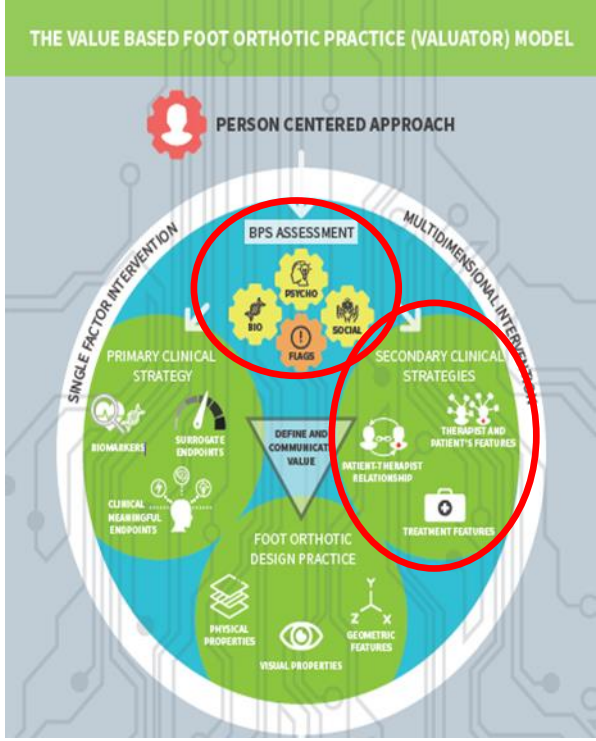

VALUE MONITORING
BIOLOGICAL
TOO HIGH
TOO LOW
PSYCHOLOGICAL
SOCIAL
BPS STRESS LEVEL
ZONE OF OPTIMAL BPS STRESS
SECONDARY CLINICAL STRATEGY
PRIMARY CLINICAL STRATEGY
CLINICAL ENDPOINT



- Man, 22 years old , with pain in the second metatarsal joint
- He run 4 time per weeks
- He works a lawyer and every day is seat
- He wear brogues shoes to work and he run with Broooks model Ghost 12
- The pain is located in the second metatarsal joint right foot and hurts more in the morning when lifting.
- The evolution of pain is since 6 months and the progression is worst in the last 3 weeks
- The patient has no other disease
- The treatment has been ice in the location and NSAID´s in the last 2 months but they didn´t reduce the pain

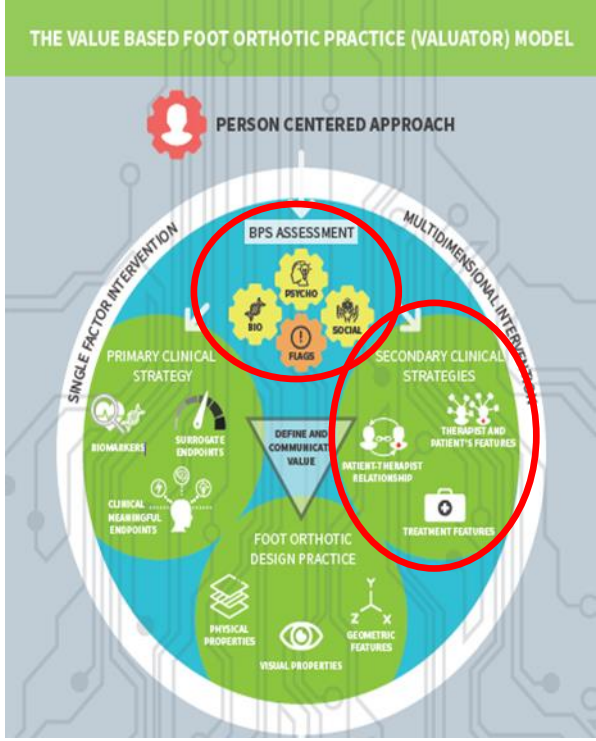
Physical examination

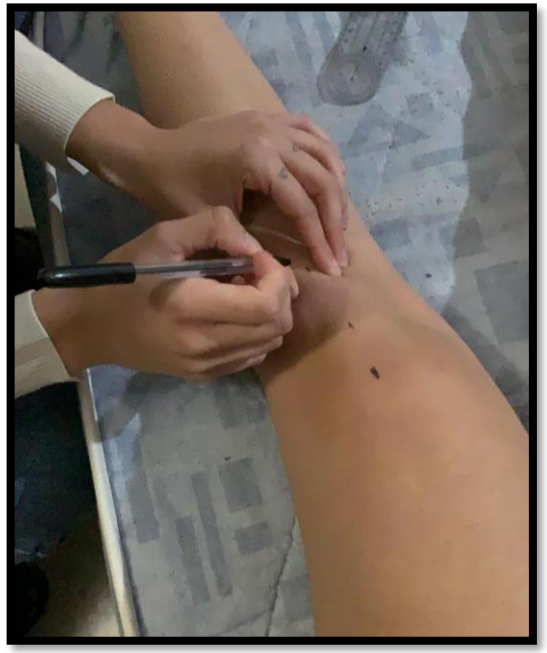
- Palpation over the second metatarsal joint right foot was found to be painful
- Pain : VAS 7/10 (when at its worst)
- No rash, swelling or temperature increase was detected at the metatarsal joints during physical examination.
- On standing, Test of Foot Posture Index +9 right foot and +10 left foot
- Limitation in the assessment of dorsiflexion of Tibiotalar joint movements. Subtalar joint passive supination was limited in the last part.
- Repetitive manual muscle testing of lower limb muscles and extrinsic foot muscles did not reveal any weakness.
- Jack test was positive in both feet
- Doming and toe flexion testing revealed poor muscle selectivity and force.
- Clinical assessment of lower limb length ruled out relevant length discrepancy between both legs.



Physical examination

- Q angle is valgus bilaterally.
- He also experienced shoe wear isolated to the medial side.
- The patient has a body mass index of 22.5 kg/m² (normal score) and reduced physical activity by the pain. This frustrates the patient considerably because he is training to run the half marathon of Malaga in 6 weeks.
- Besides of non-inflammatory characterized joint pain, rheumatoid arthritis and other inflammatory conditions were ruled out with detailed blood samples (complete blood count, erythrocyte sedimentation rate, C-reactive protein and rheumatoid factor were normal)

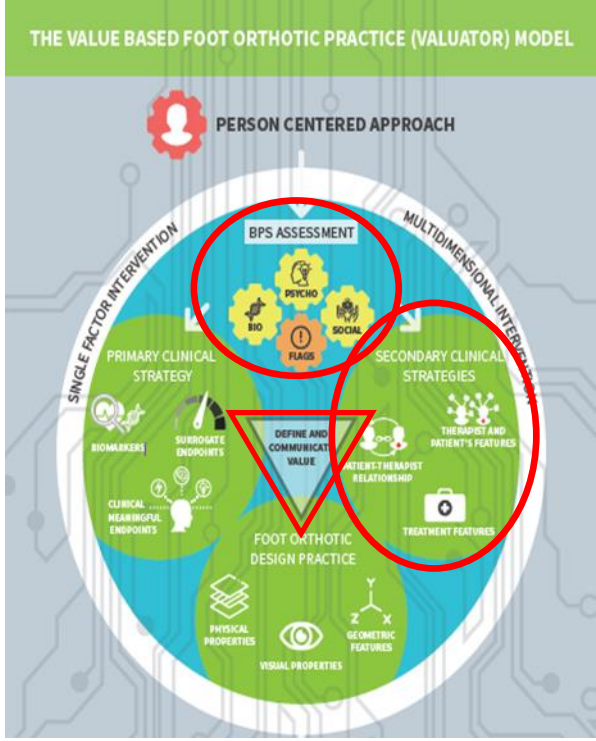




Patient Reported Measure about Foot Funcion

The Foot Function Index (FFI)

Pain Subscale: How severe is your foot pain:	0	1	2	3	4	5	6	7	8	9	10
Foot pain at its worst?	○	○	○	○	○	○	○	◉	○	○	○
Foot pain in morning?	○	○	○	○	○	○	○	○	○	◉	○
Pain walking barefoot?	○	○	○	○	○	○	○	○	◉	○	○
Pain standing barefoot?	○	○	○	○	○	○	○	○	◉	○	○
Pain walking with shoes?	○	○	○	○	○	○	○	◉	○	○	○
Pain standing with shoes?	○	○	○	○	○	○	○	◉	○	○	○
Pain walking with orthotics?	○	○	○	○	○	◉	○	○	○	○	○
Pain standing with orthotics?	○	○	○	○	○	◉	○	○	○	○	○
Foot pain at end of day?	○	○	○	○	○	○	○	◉	○	○	○
Disability Subscale: How much difficulty did you have:	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Difficulty walking in house?	○	○	○	◉	○	○	○	○	○	○	○
Difficulty walking outside?	○	○	○	○	○	○	○	○	◉	○	○
Difficulty walking 4 blocks?	○	○	○	○	○	○	○	○	◉	○	○
Difficulty climbing stairs?	○	○	○	○	○	○	○	◉	○	○	○
Difficulty descending stairs?	○	○	○	○	○	○	○	◉	○	○	○
Difficulty standing tip toe?	○	○	○	○	○	○	○	○	◉	○	○
Difficulty getting up from chair?	○	○	○	○	○	○	◉	○	○	○	○
Difficulty climbing curbs?	○	○	○	○	○	○	○	◉	○	○	○
Difficulty walking fast?	○	○	○	○	○	○	○	○	○	◉	○



Patient Reported Measure about Foot Funcion

The Foot Function Index (FFI)

Activity Limitation Subscale: How much of the time do you:	0	1	2	3	4	5	6	7	8	9	10
Difficulty walking in house?	○	○	○	○	○	◉	○	○	○	○	○
Difficulty walking outside?	○	○	○	○	○	○	○	◉	○	○	○
Difficulty walking 4 blocks?	○	○	○	○	○	○	◉	○	○	○	○
Difficulty climbing stairs?	○	○	○	○	○	○	○	◉	○	○	○
Difficulty descending stairs?	○	○	○	○	○	○	○	◉	○	○	○

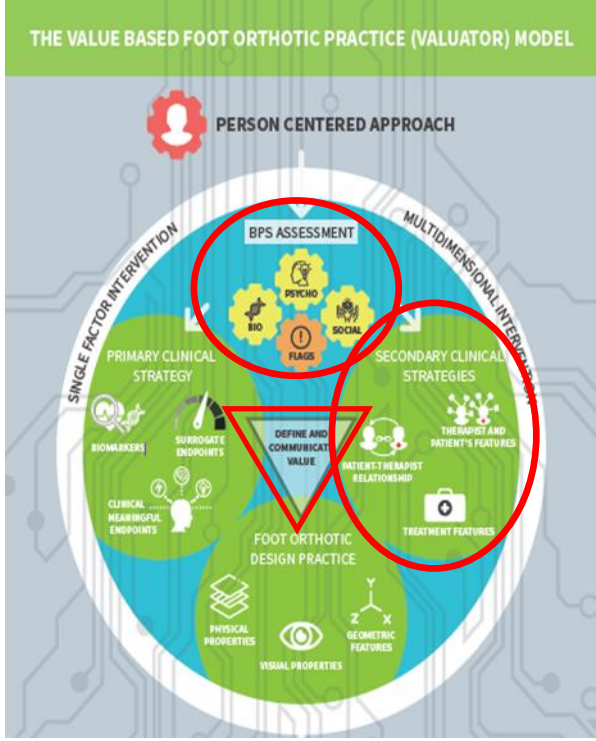
Calculate

Total score :

Pain Scale = 63/90

Disability Scale = 63/90

Activity Limitation Scale = 32/50



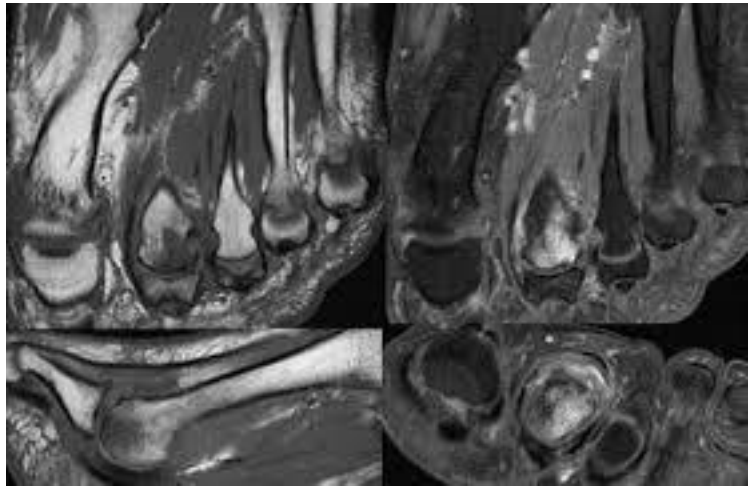
Activity limitation high

Medical imaging

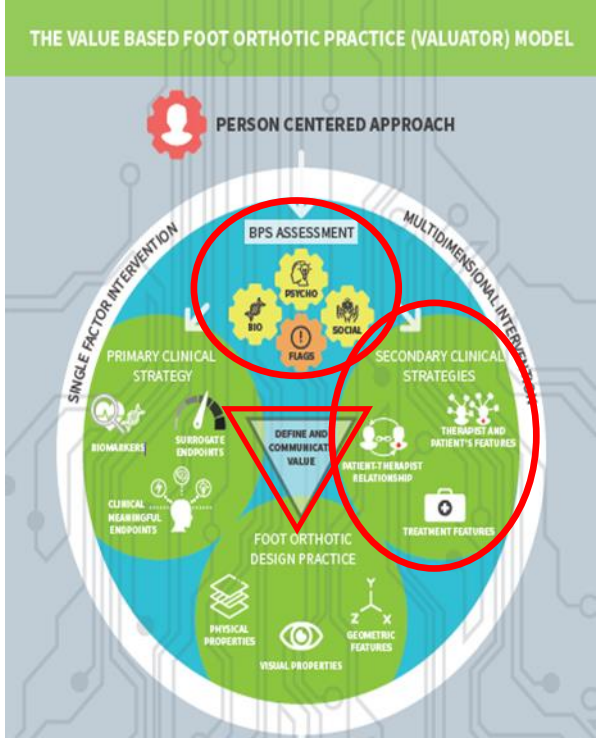
- **Rx imaging**

Phase II

MRI



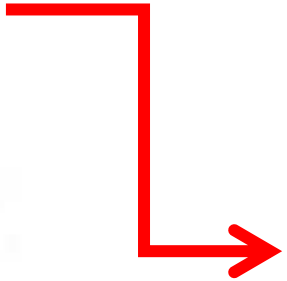
MRI investigation revealed: destruction second metatarsal phalangical joint



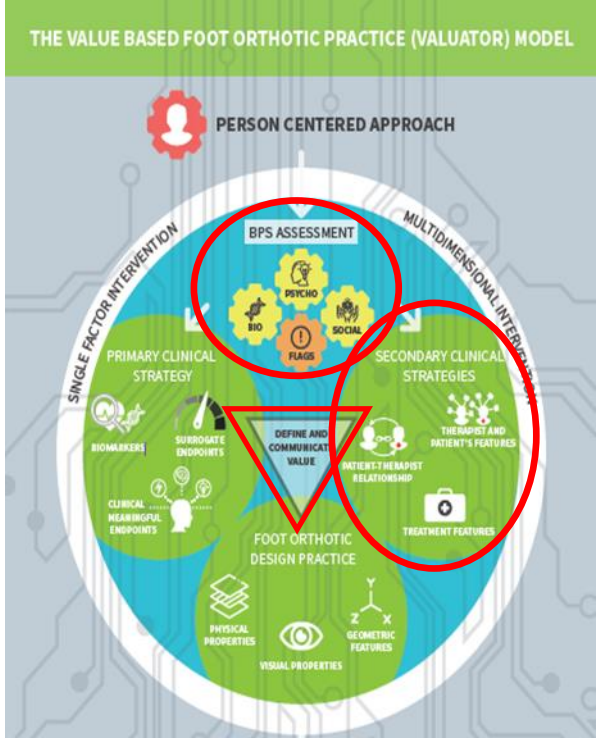
Rx investigation revealed: Cup form joint second metatarsal phalagincal joint

Medical imaging

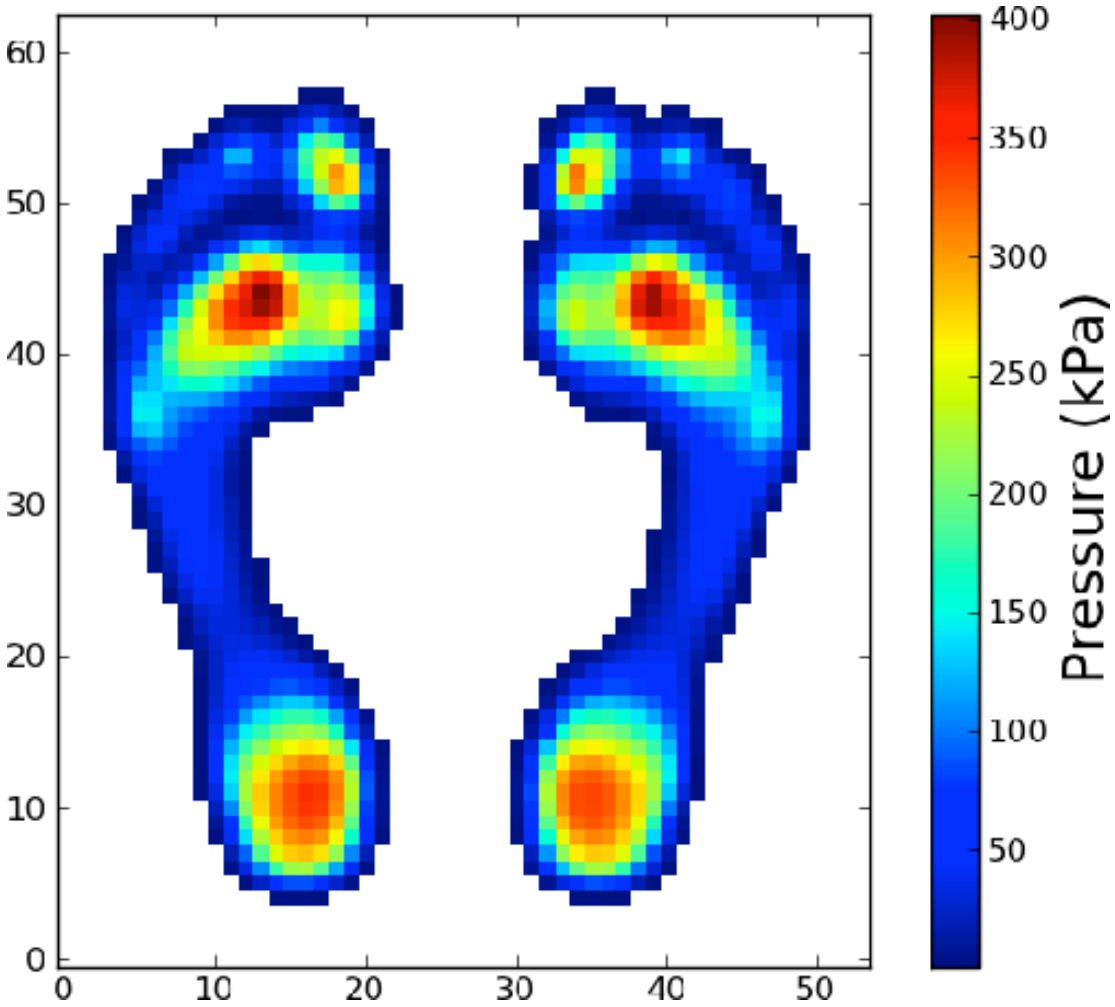
- **Gammagraphy imaging**

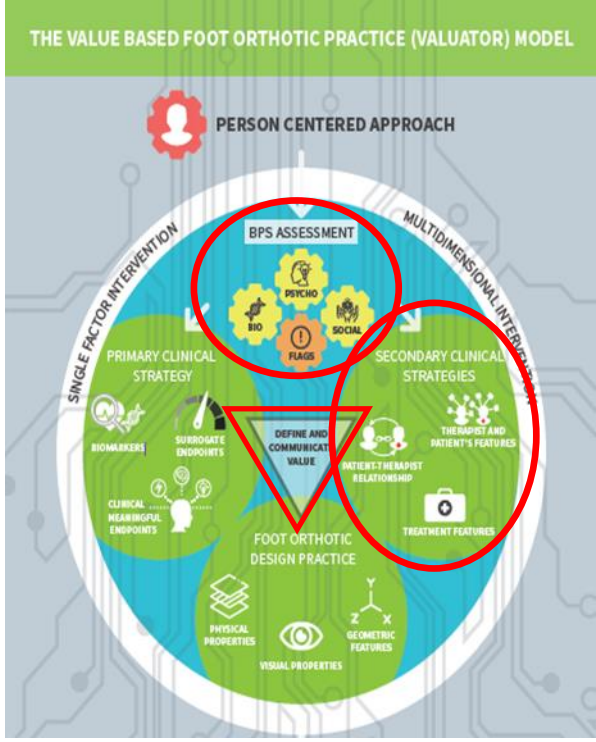


Evidence diffuse inflammation in the are of the second metatarsal phalangeal joint



Gait analysis: Plantar pressure measurement



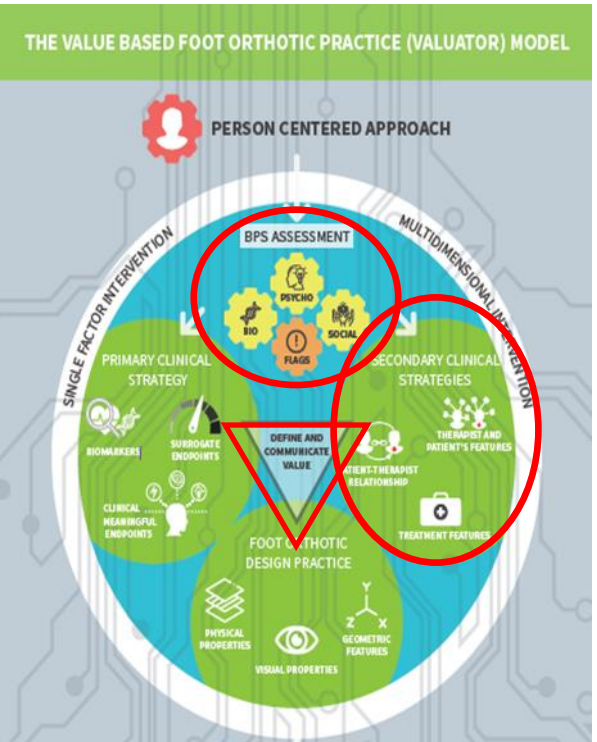


Standing pressure

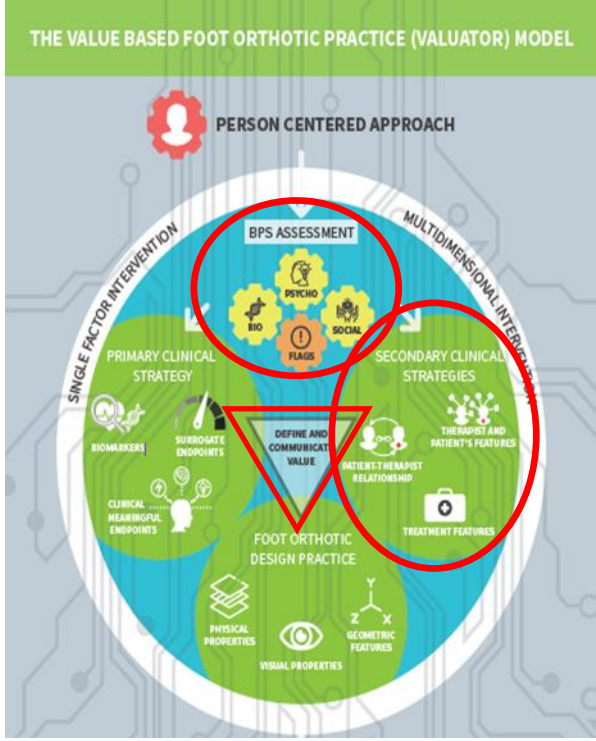
Increase plantar pressure in the second metatarsal joint

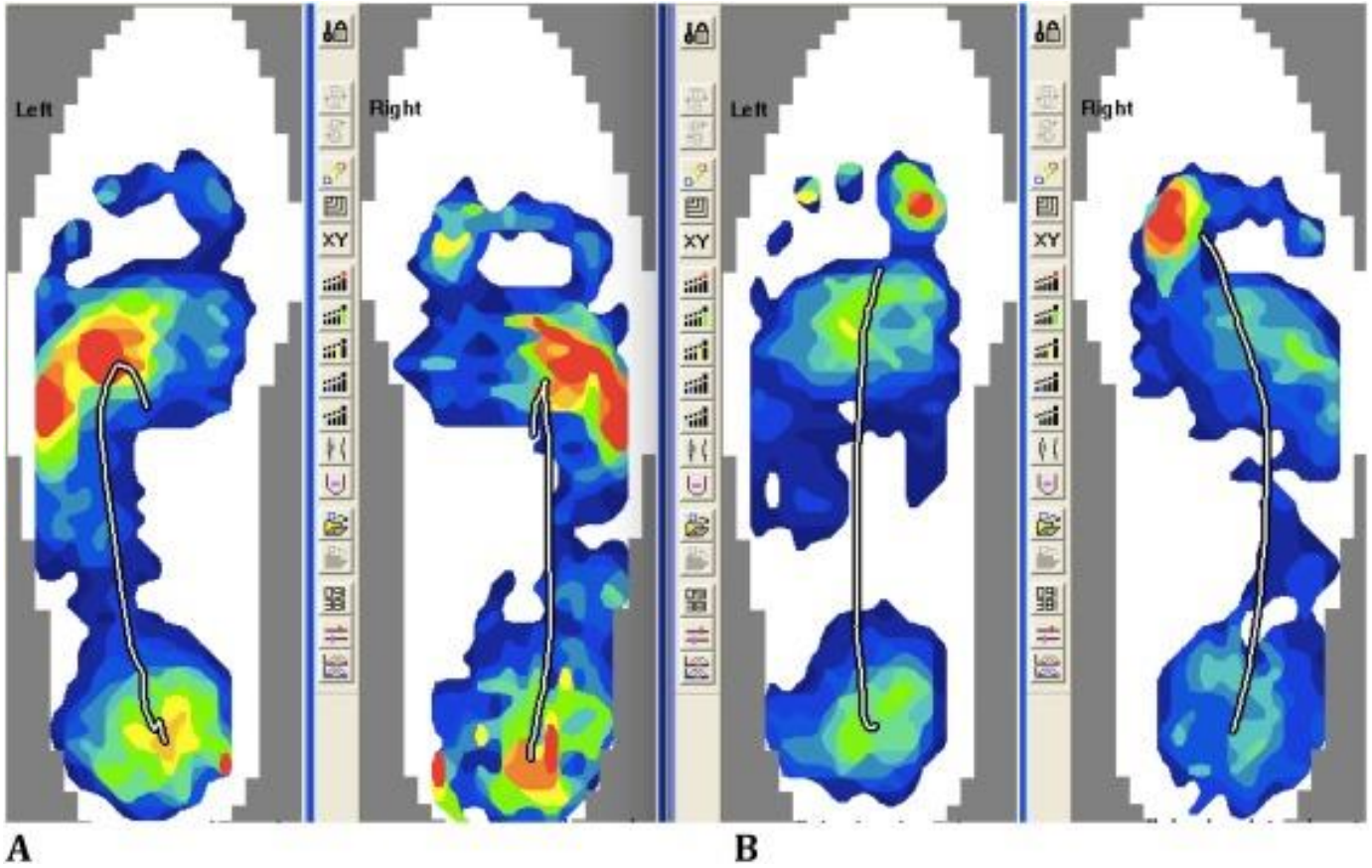
Foot print distribution correct

Gait analysis: 2D video-analysis

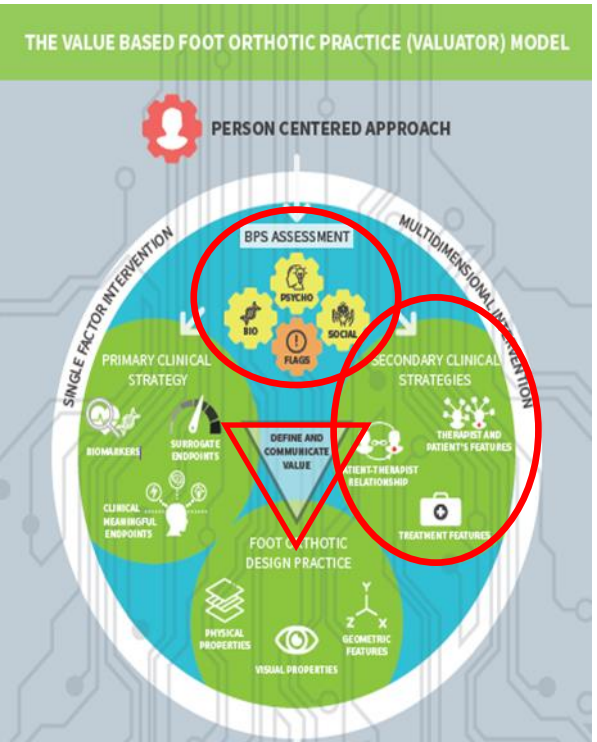


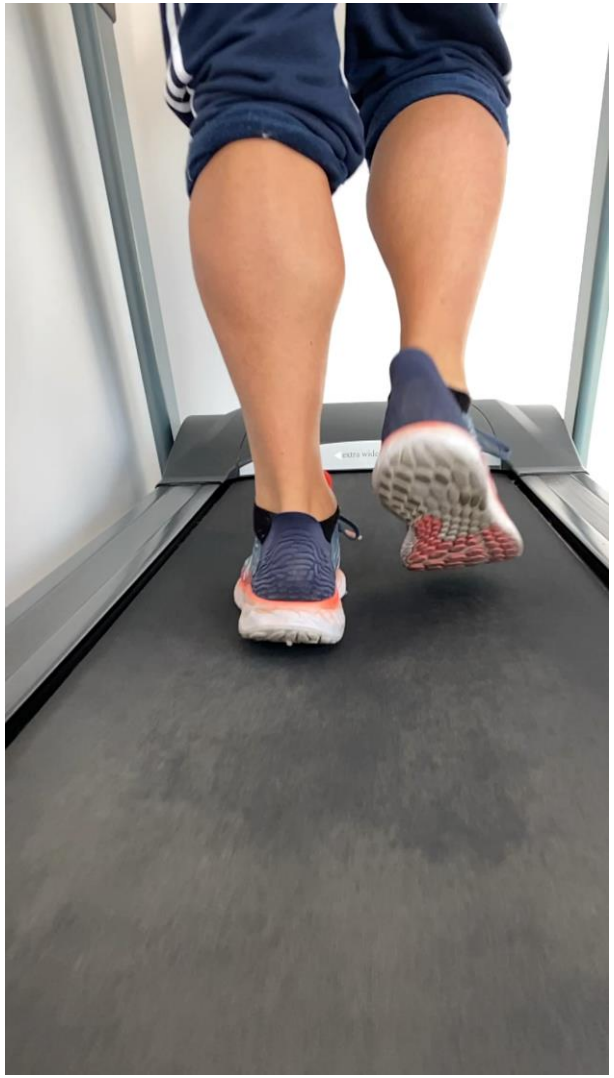
Gait analysis: 2D video-analysis

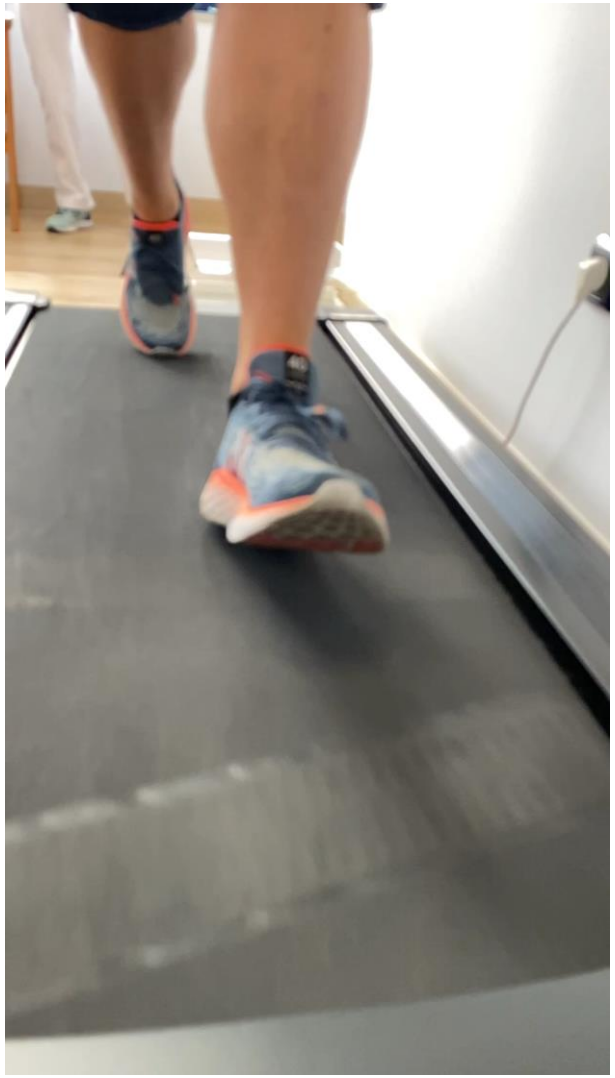


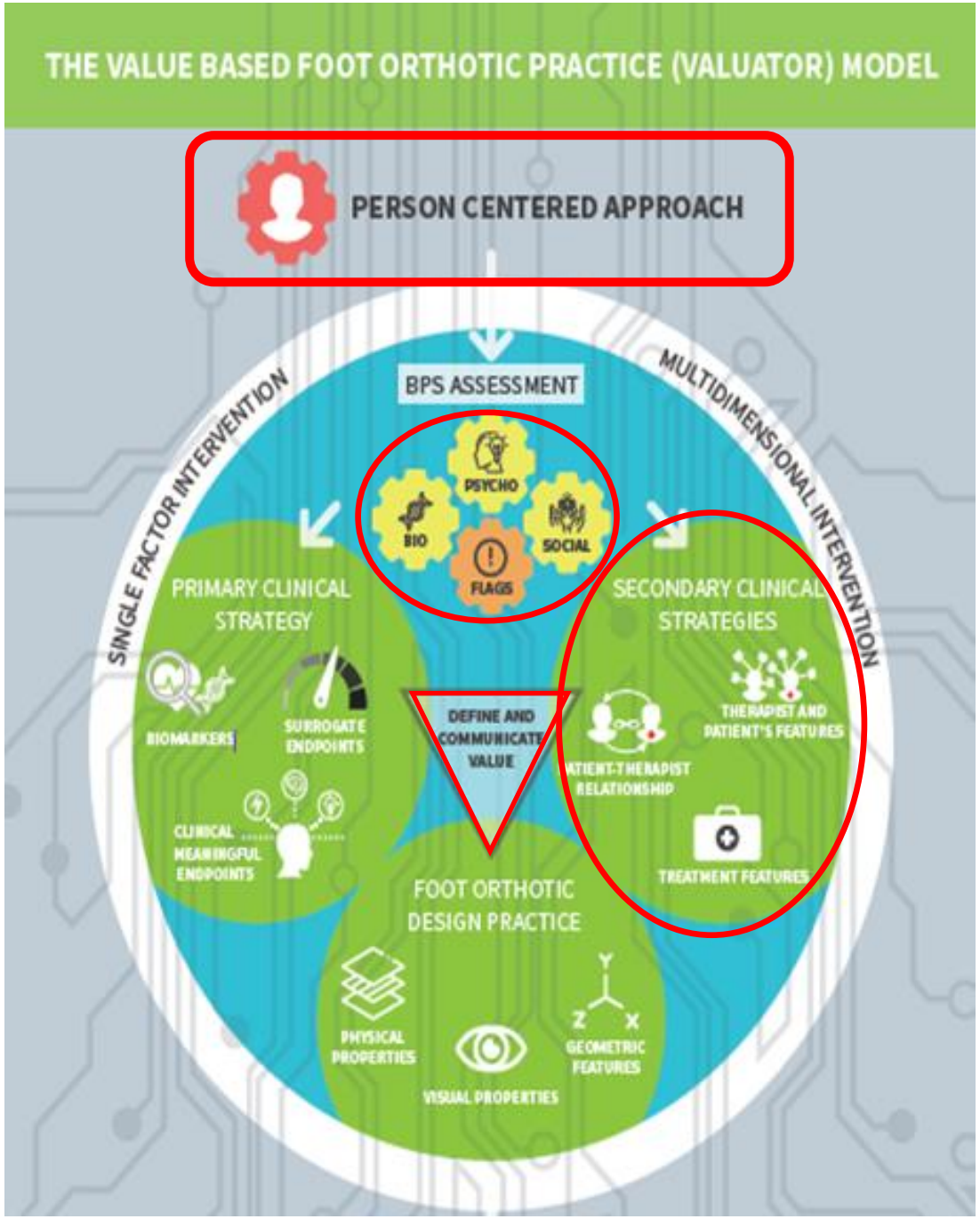


Gait analysis: 2D video-analysis





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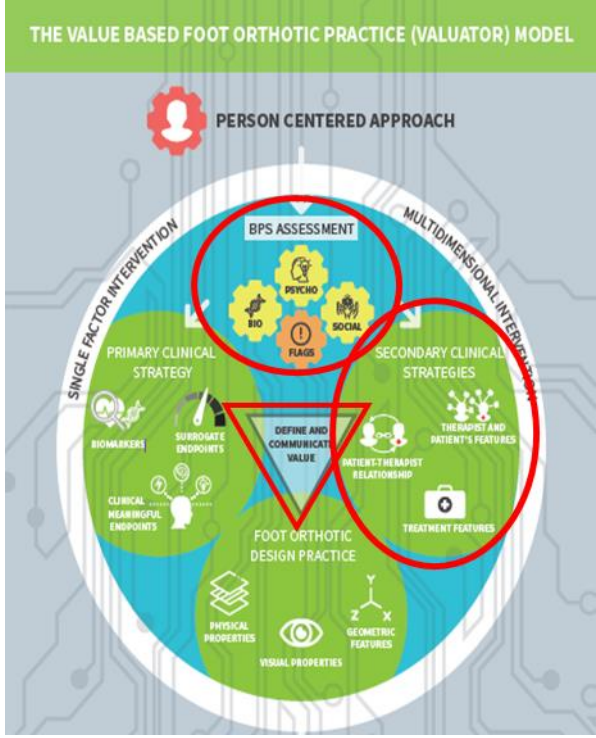
Y
Z
X

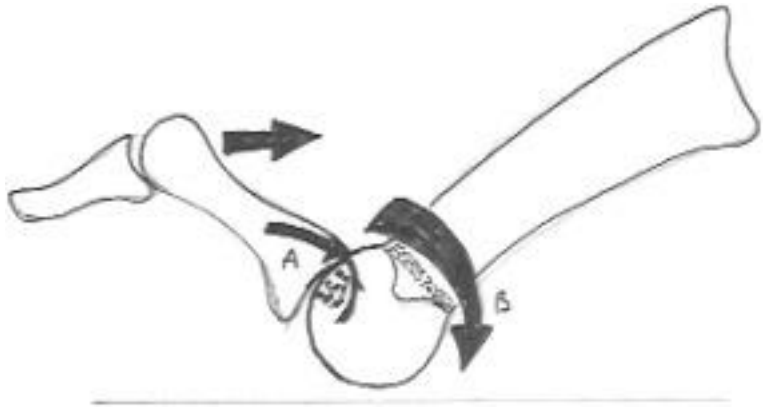

Feedback

Diagnosis

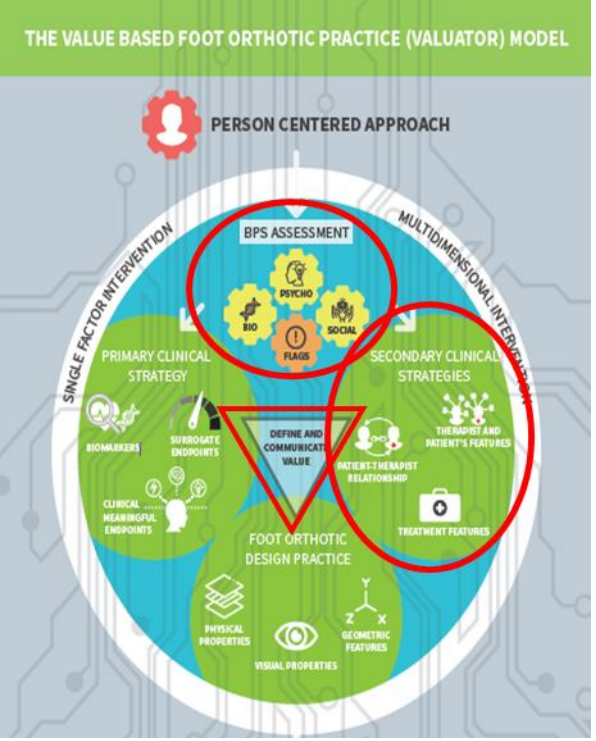
- Based and the clinical findings the patient was diagnosed with Freiberg's Disease phase II

M.R. Carmont, R.J. Rees, C.M. Blundell
Current concepts review: Freiberg's disease
Foot Ankle Int, 30 (2009), pp. 167-176
http://doi.org/10.3113/FAI-2009-0167





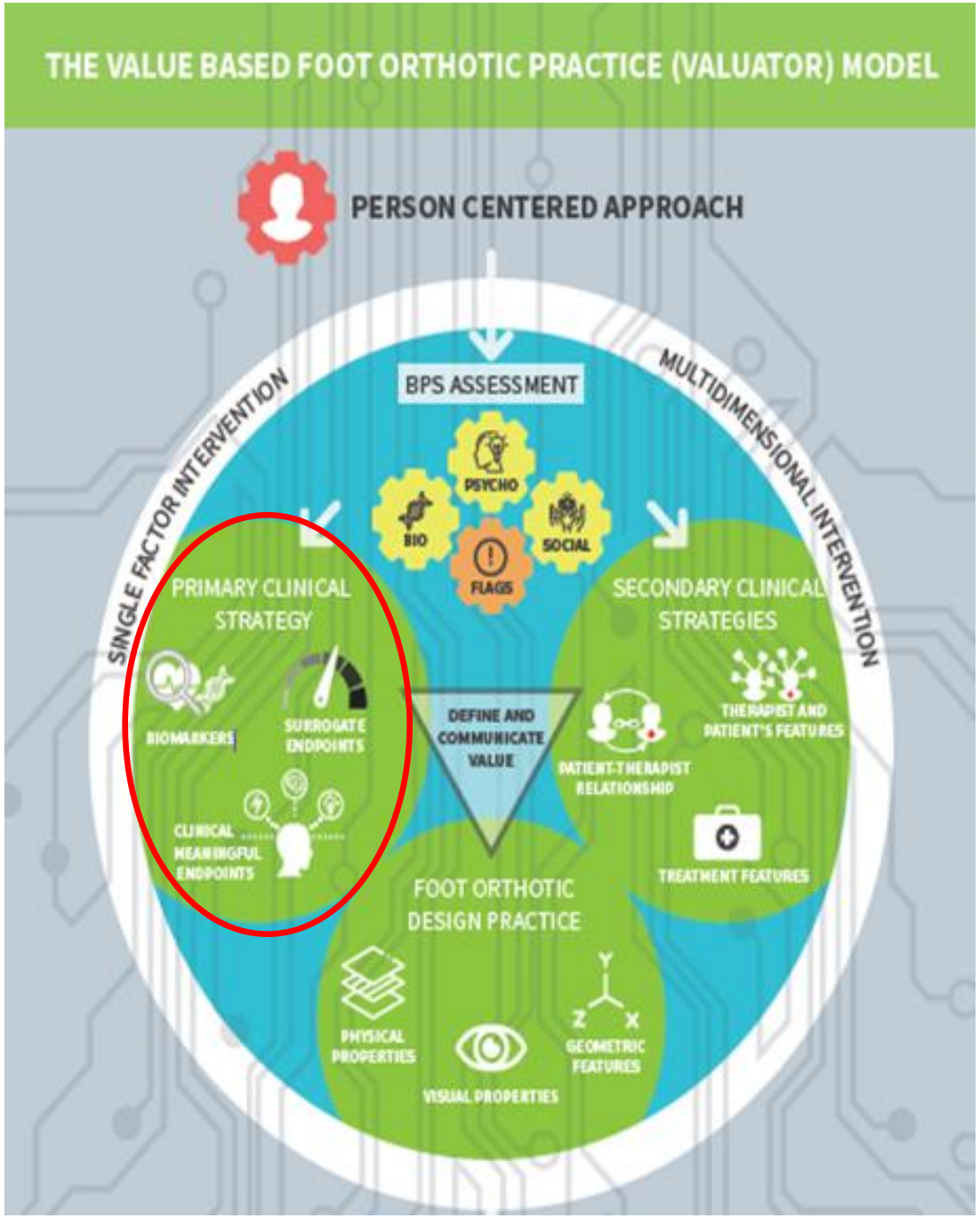
Original drawing by McMasters MJ (1978). Journal of *Bone & Joint Surgery*. 60B:82–7. The original diagram shows a proposed mecbending moments at the metatarsal neck.



Diagnosis

- Described the condition as an osteonecrosis of the second metatarsal head
- The aetiology remains poorly understood, although excessive tissue stress resulting in overload of the metatarsal head, creating micro trauma and cartilage degeneration, is the most widely accepted pathomechanical cause suggested

Longworth R, Short L, Horwood A. Conservative treatment of Freiberg's infraction using foot orthoses: A tale of two prescriptions presented as a case study to open debate. Foot (Edinb). 2019 Dec;41:59-62. doi: 10.1016/j.foot.2019.07.002.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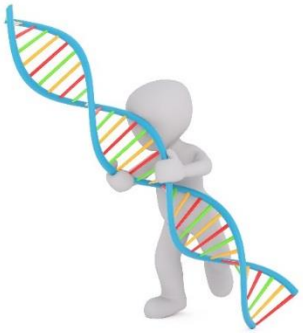
Primary Clinical Strategy



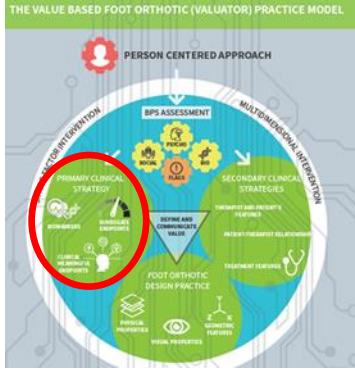
Patient perspective

Clinical meaningful endpoint reported by patient	Short and mid-term goals	Long-term goals	Clinical Measure
Pain-discomfort in daily activities	x		FFI (Daily Activity scale) + VAS
Increased work related stress due to foot pain	x		FFI (Daily Activity Scale)
Improve running activities		x	FAAM (Sports scale)
Increased body muscle tone		x	Scale

Therapist perspective

CME: Clinical Meaningful Endpoints
SE: Surrogate endpoint

Endpoint reported by therapist	Short and mid-term goals	Long-term goals	Measure
Rheumatic disease	x		Biomarker: Blood pressure
Pain-discomfort during daily activities and at work	x		CME: VAS+ FAAM (Daily Activity Scale)
Avoid progression towards stage III	x		Biomarker: MRI, Rx and Gammagraphy
Foot Posture	x		CME: Foot Posture Index
Changes of pressure	x		SE: 2D video-analysis & plantar pressure measurement

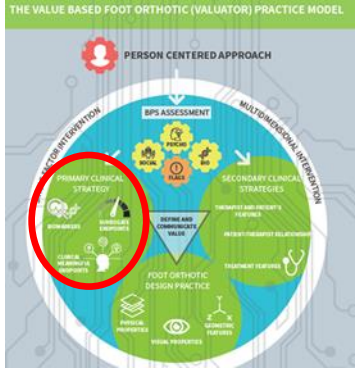


Therapist perspective

CME: Clinical Meaningful Endpoints
SE: Surrogate endpoint

Endpoint reported by therapist	Short and mid-term goals	Long-term goals	Measure
Improve running activities		x	FAAM (Sports scale)
Reduce of pain		x	Scale

Multidimensional approach



- Referral to rheumatologist
  - detect if have some rheumatic disease
- Physical therapy:
  - Ice and rice
  - Injection corticoide
  - Laser therapy

THE VALUE BASED FOOT ORTHOTIC PRACTICE (VALUATOR) MODEL

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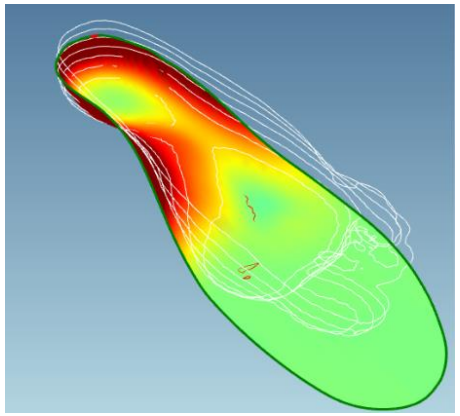
FOOT ORTHOTIC DESIGN PRACTICE

PHYSICAL PROPERTIES

VISUAL PROPERTIES

GEOMETRIC FEATURES



Endpoint reported by therapist	Short and mid-term goals	Primary Clinical Strategy	Secondary Clinical Strategy
Pain-discomfort in daily activities	x		
Increased work related stress due to foot pain	x		
Improve running activities		x	
Increased body muscle tone		x	
Pain-discomfort in daily activities	x		