Output 1:

Clinical case 2

FutureFeet

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Thank you to Dr Saeed Forghany for their assistance with data for the case study

Introduction to the task

- The aims for this session are:
- To use the editor framework and valuator model with a complex high risk case with a view to applying evidence based foot orthotic practice

- Learning outcome
- On completion of this session learners will be able to use the conceptual BPS framework and model as it relates to a high risk diabetes case study.

Summary of task

What is the Editor framework?

- The EDITOR framework is a digital network for holistic patient centred care.
- It is aimed at students and healthcare practitioners.
- This framework provides a comprehensive illustration showing a series of circuits allowing patient centred digital data to flow into, within and out of the network.
- Students and practitioners can use the framework as part of a comprehensive patient management strategy.
- Knowledge and understanding of the circuit contents are pre-requisites to successful application of the framework in practice.

What is the Valuator model?

- The valuator model continues the biopsychosocial continuum of holistic patient centred care.
- The valuator model is central to both

    1) Patient centred approach – philosophy of patient care and multi dimensional strategies

    2) Value based healthcare – measurable and achievable outcomes

Summary of the Editor framework circuits

Professional Values circuit – professional identity and reflective skills

Assessment circuits – knowledge, understanding and attitude

Patient centred approach – philosophy of patient care and multi dimensional strategies (valuator model)

Value based healthcare – measurable and achievable outcomes (valuator model)

Interventions circuit – metacognitive and cognitive skills

What are the pre-requisites to using the Editor framework?

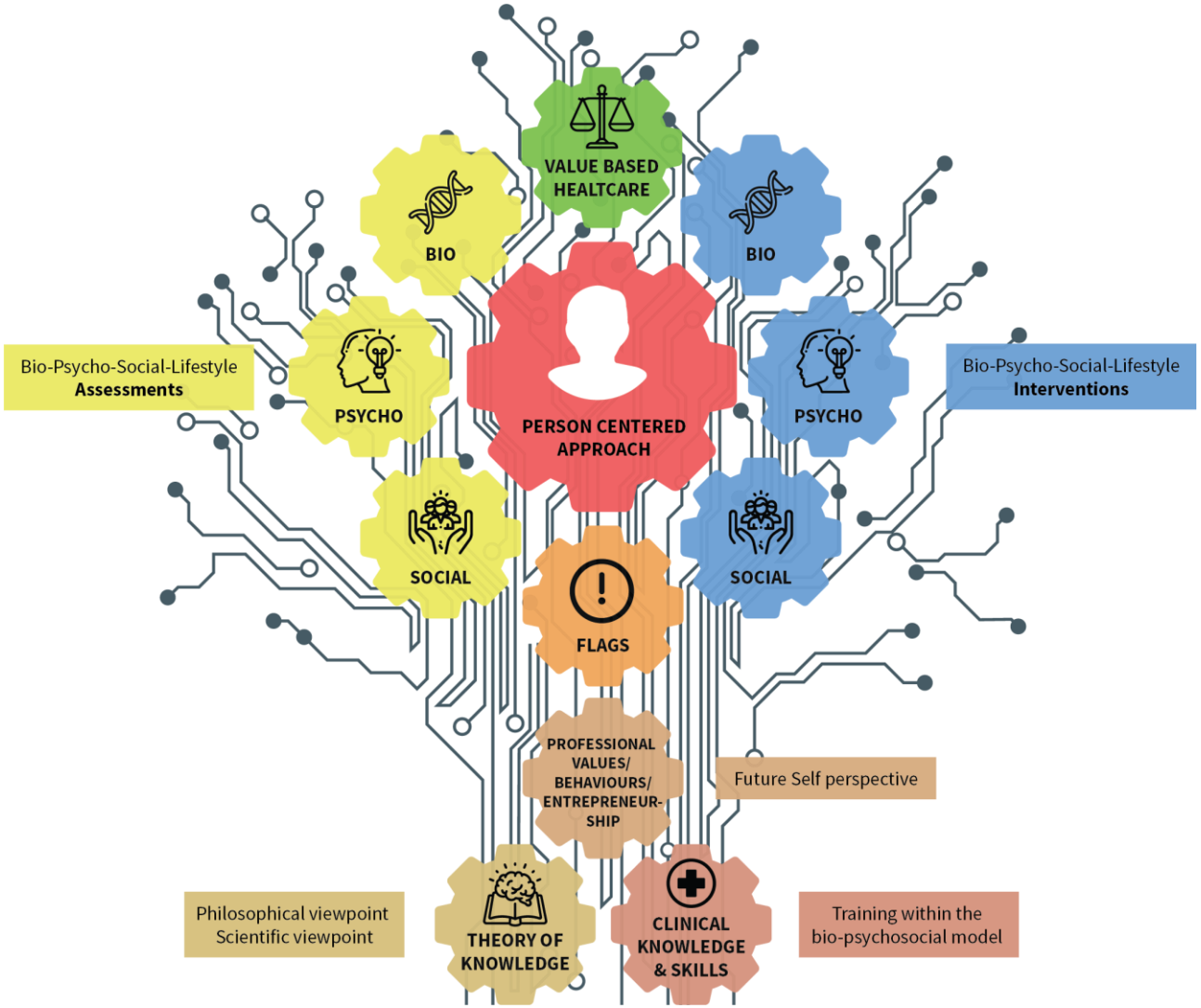
Essential

- Knowledge of the bio psycho social model (intellectual skills / attitude)
- Experience of using skills in history taking (verbal skills)
- Clinical knowledge of lower limb anatomy (intellectual and motor skills)

Desirable

- Clinical knowledge of lower limb pathologies (intellectual and motor skills)
- Understanding of medical conditions (intellectual skills and cognitive strategy)
- Ability to use simple outcome measures (cognitive strategy)
- Ability to use data for planning interventions (cognitive strategy)

The ValuE BaseD DIgiTal FOot CaRe Framework (EDITOR FRAMEWORK)



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

Complex Case study

This case study will feature clinical challenges in 5 key areas

- Mechanical factors
- Metabolic factors
- Vascular factors
- Educational factors
- Psychosocial factors

Case Study

A 45 year old man presents with metatarsal pain in the right foot.

Pain is described as being around the forefoot – indicates second and third metatarsal head with overlying plantar callus.

There is dorsal swelling over the midfoot.

There is difficulty with wearing closed footwear, hence patient is wearing sandals.

Metabolic factors

Type II diabetes
Medication: Poiglitazone, Metformin, Gliclazide.
Recent HBA1C 58mmols/mol

Hypothyroidism
Medication: Levothyroxine

co-morbidity of Osteoarthritis affecting the right knee, hands and ankle
Medication: Naproxen (oral) and capsacin cream for topical use

“

Vascular factors

- Medication
- Hypertension: Ramipril
- Lipid dysfunction: Atorvastatin

- Findings
- ABPI measure R side 110/125= 0.88 L side 110/130 = 0.84
- Medical notes identify micro and macro vascular disease is present.

Educational factors

- Findings
- He admits his diet has been poor for the last year, with regular consumption of take away meals and high processed food.

- He doesn’t like coffee or tea, so drinks mostly diet coke during the day.

- He hasn’t been to see his GP or practice nurse in the last year as he is embarrassed and has gained weight.

Psychosocial factors

- Findings
- Employed as a Head teacher at a local high school which is in special measures and has performance targets to meet in the next 6 months

- Associated anxiety as his 14 year old daughter is struggling with school work and he has taken some time off work to support her.

- He is suffering from fatigue and is not sleeping well

Case study Cognition tasks

- Using your intellectual skills what aspects of editor model circuit links to mechanical factors? Key word= Biological
- Using your clinical experience what aspects of the editor model circuit links to how you think about the mechanical factors for this person? Key word = Psychosocial
- Using your memory recall of lower limb anatomy what information will you need to plan an intervention? Key word =(Biological) data
- Using your knowledge and understanding of medical conditions what factors will you consider for a person centred approach? 5 key areas mechanical, vascular, metabolic, educational and psychosocial factors. What strategy will you deploy to demonstrate awareness of evaluating your intervention plan? Use mearningful outcome measures

Cognition Tasks: Progress check

- **Big picture** – the person has foot pain, they have diabetes, mild vascular disease, poor diet and mental health challenges due to work and family circumstances

- **How can the therapist use critical thinking and cognitive skills with a person centred approach ?**
- Use the editor and valuator model

- Remember - use your cognitive skills to problem solve your person centred management strategy in 5 key areas
    - **Mechanical factors**
    - **Vascular factors**
    - **Metabolic factors**
    - **Educational factors**
    - **Psychosocial factors**

Model answer approach follows

Complex clinical case study

Physical examination findings

Look, feel, move, principle approach employed (see Versus Arthritis) https://bit.ly/3z6dQ9g

Pain on palpation plantar aspect of 2-3rd metatarsal heads.

Gait observations – transverse plane spread of the forefoot and fibular deviation of the digits on weightbearing.

Limited range of dorsiflexion movement in the ankle joint resulting in an apropulsive gait

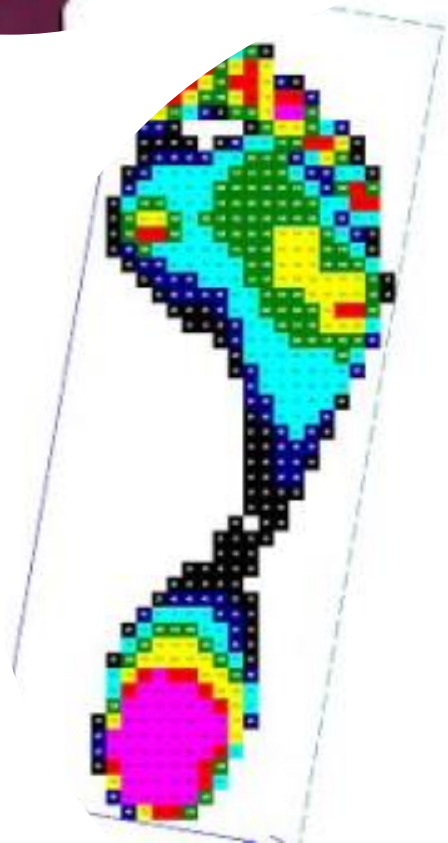
MRC scale score =3. Reduced motor power in lower leg muscles and intrinsic muscles of the foot (Medical Research Council)

Intact sensory perception in both feet using 10g monofilament

Mechanical factors

The pedar® system was employed to measure the interaction between foot, shoe and ground, by inserting a sensor insole into the shoe.

This provided a measure of the plantar pressure on the symptomatic foot.



Pedar raw data summary

The heat map illustrates the values for plantar pressure in the region of the right forefoot.

This can be compared to the lower plantar pressure in the region of the rearfoot.

Sensor	Time/picture:20.0 ms
MV over frames	
Sensor size: 0.707x0.707 cm	
novel munich/st.paul/london	
pedar is a registered trademark of novel	
Pict-No.: MPP Force[N]=sum*sensor_area in row/column	

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33	50	135	155	150	150	135	80	20										
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35	10	70	125	135	125	90	40											
36		40	75	90	90	55												
37			30	45	35	10												

Mechanical factors

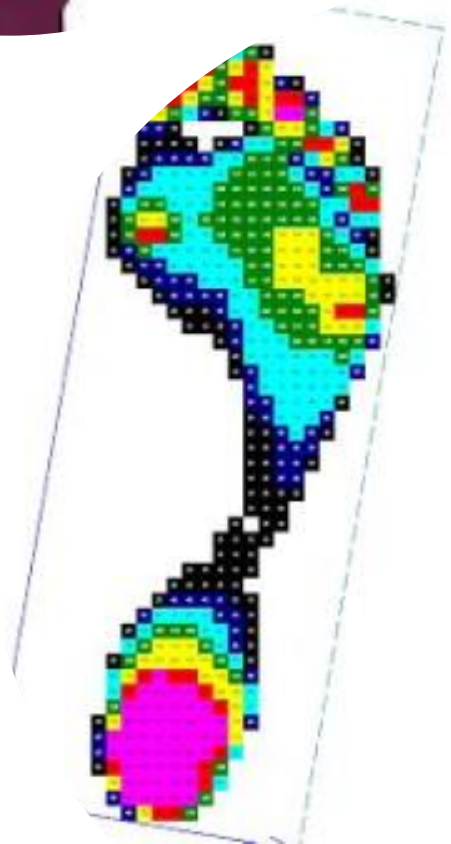
Plantar pressure data revealed higher pressure levels over the central metatarsal region.

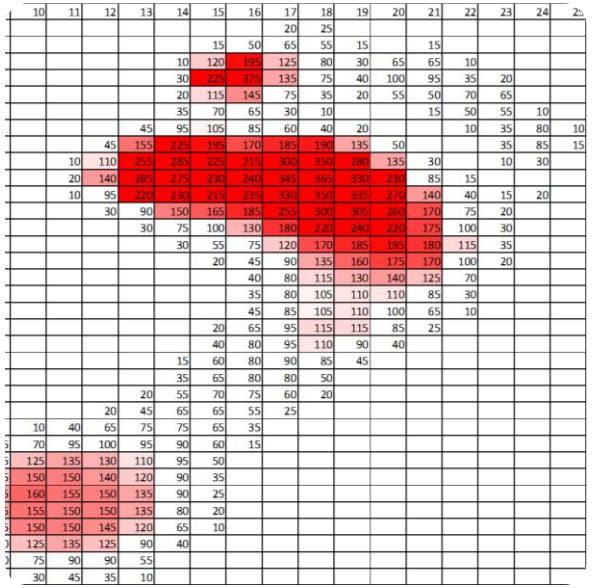
Clinically this related to the anatomical area extending from the second to fourth metatarsal head.

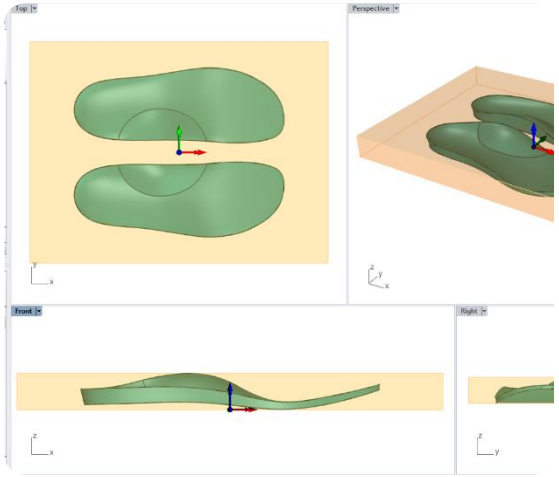
A peak value of 365kPa was noted over the third metatarsal head.

Plantar Pressure exceeding **300kPa was concentrated over an area approximately 2cmx3cm**

(see raw data for details)



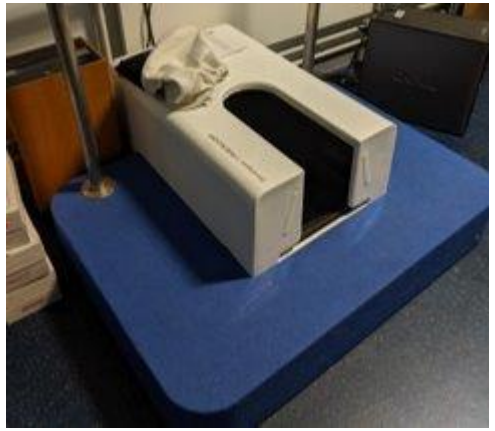




Mechanical

- Choose a system for 3-d Scan of foot – capture foot shape
- Identify design features for a custom made foot orthotic from foot pressure data
- Create the foot orthotic using CAD software

Foot shape capture – range of options

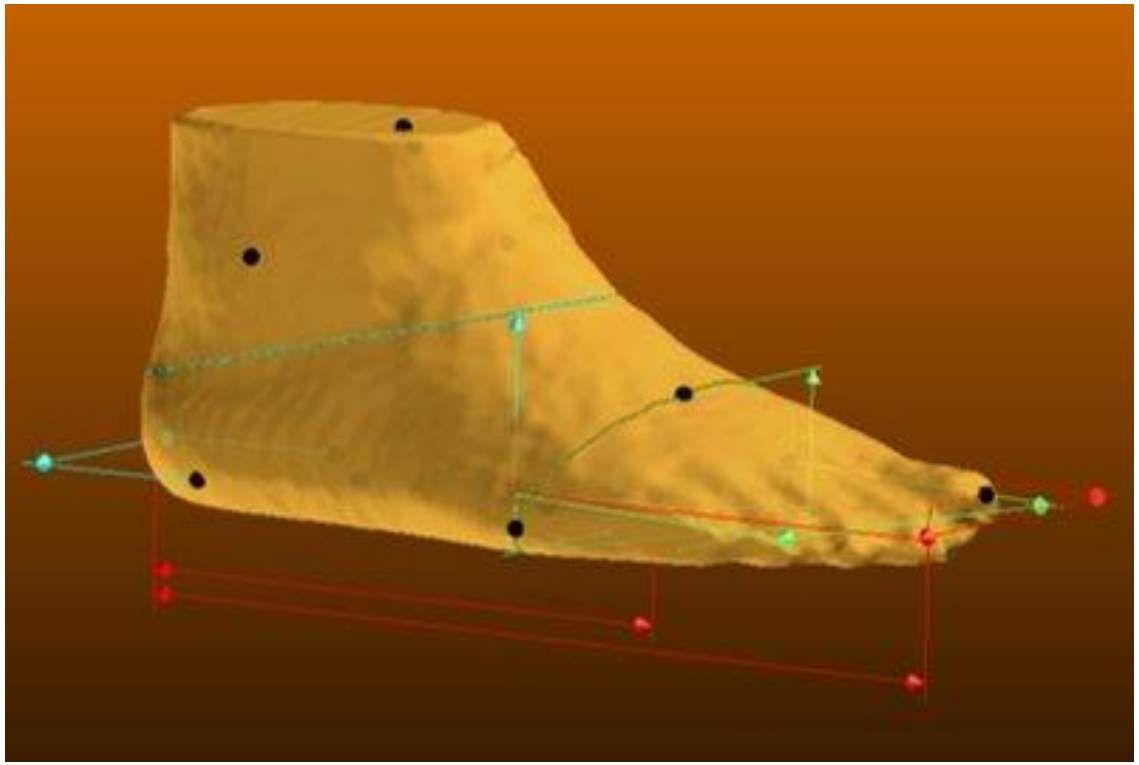


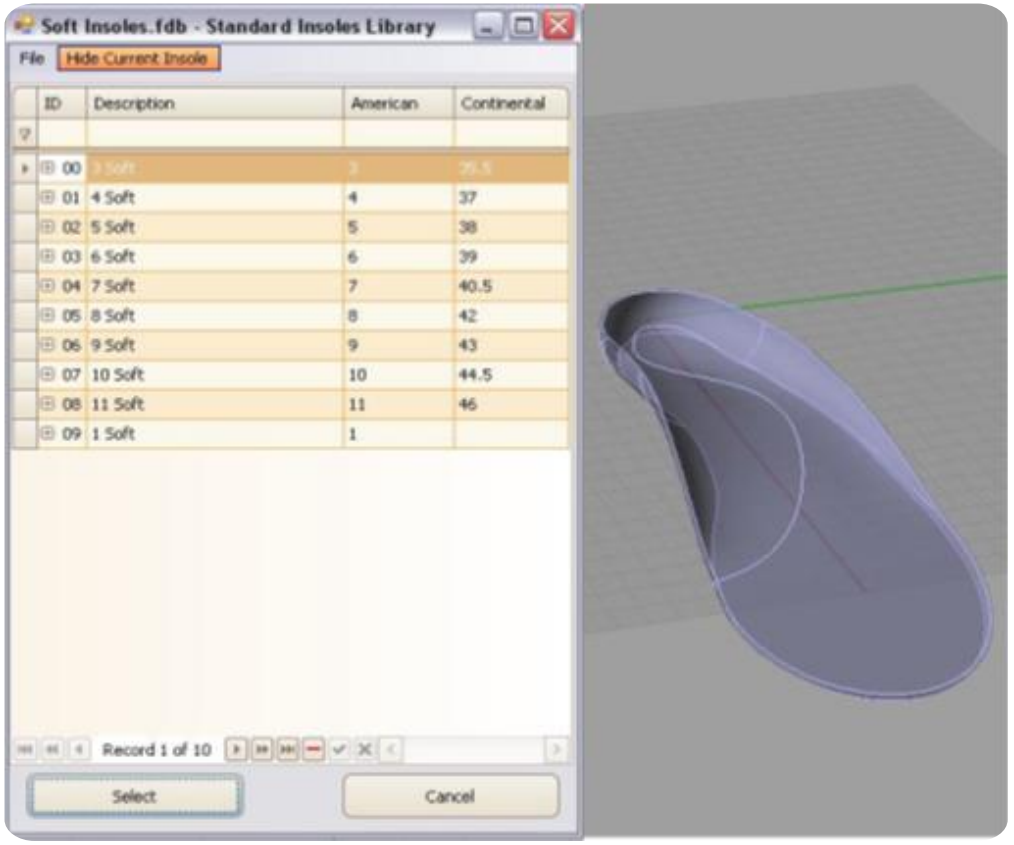
Capture of the whole foot allows assessment for both insole/orthotic fitting and footwear fitting.

Plantar surface scan allows measurement for Insole fitting only.

Digital method allows comparison of foot shape using a range of measurements which can be automatically applied

Digital foot shape





Template CAD design

- **Templates** design was selected
- Allows a controlled base design

- Allows predefined additions and modifications for the high pressure identified at the forefoot

- Design considerations focused on offloading pressure from the peak areas under the forefoot

3D milling

- Platform to allow fixing of multiple blocks for nested milling.
- Option to rotate mill allowing top and bottom milling
- Uses CAM software to automate positioning and calculate optimum tool paths

Materials

- EVA, Poron and Poly-Urethane

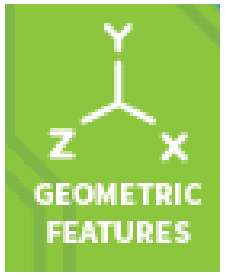
THE VALUE BASED FOOT ORTHOTIC PRACTICE (VALUATOR) MODEL

FOOT ORTHOTIC DESIGN PRACTICE

EVA, Poron and Poly-Urethane were selected to reduce plantar pressure

Current practice utilises

direct milling with material combinations



Design considerations to offload pressure over the forefoot are

Met Bar, Skive, Cut away/Recess

THE VALUE BASED FOOT ORTHOTIC PRACTICE (VALUATOR) MODEL

FOOT ORTHOTIC DESIGN PRACTICE

PHYSICAL PROPERTIES

VISUAL PROPERTIES

Y
Z X
GEOMETRIC FEATURES

Vascular intervention plan

- The incidence of micro vascular and macro vascular endpoints of diabetes at increasing HbA1c 48-50 mols/mol. Empower the patient through coaching and counselling support to self monitor blood glucose levels to reduce the impact of hyperglycaemia on risk of vascular complications

- This person should aim for near-normal levels, blood pressure <140/<80mmHg medication is already being taken, so and have Blood Pressure monitored 12 -24 weekly with a health care professional.

- Intervention plan – immediate advice on health benefits of increasing levels physical activity to manage hypertension and reduce the risk of vascular complications

Metabolic intervention plan

- Empower the patient through coaching and counselling support to self monitor blood glucose levels to reduce the impact of hyperglycaemia on risk of complications. This may also require specialist support from a dedicated health care professional.
- Advise immediately that any reduction would be advantageous for the person with diabetes.

- Guidelines and suggest people should aim for near-normal levels, in practice aiming for targets for HbA1c <7%

Educational intervention plan

- There is evidence that 1-2-1 education on diet and lifestyle in people with diabetes can have positive outcomes for health related quality of life.

- Specialist Counselling support would help individualise the support required. Due to the anxiety at home with family, social support may be beneficial for the extended family unit to help plan any mental health strategies and intervention.

- Reinstate GP / practice nurse appointments to help develop a weight management strategy, this will provide some wider benefits for mental and physical health.