

Conservative Management Options for Adolescent Idiopathic Scoliosis

Louise Neale and Ellie Hobbs
November 2025



Background

- Adolescent Idiopathic Scoliosis (AIS) accounts for 80-90% of all cases of scoliosis.
- During large growth spurts (around puberty) curves can rapidly deteriorate.

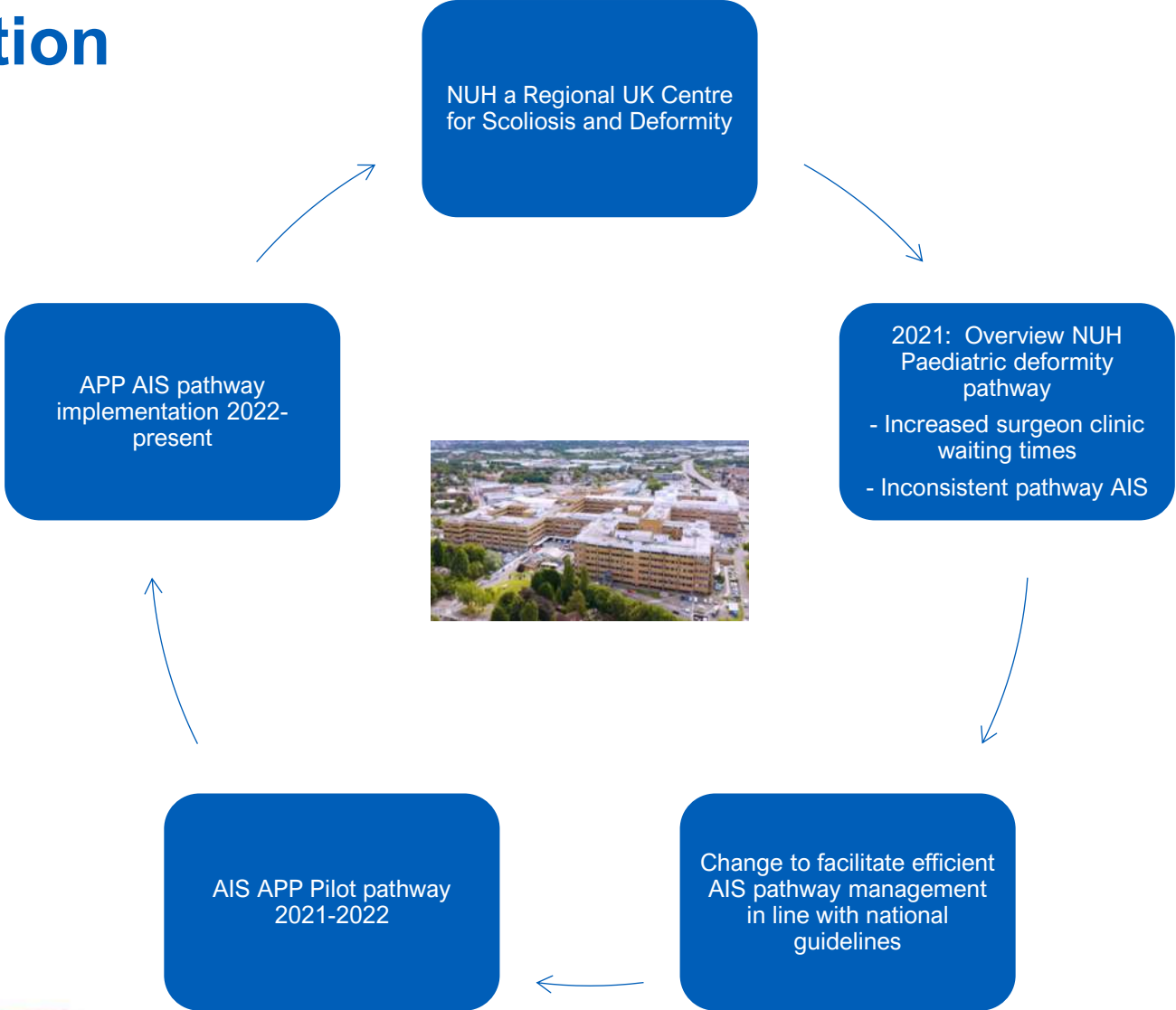
Surgery:

- Curves $> 50^\circ$ (continue to deteriorated even when growth is complete at a rate of 0.5% - 1% per year)
- Curves of 40° - 50° grey area. Some stabilise, some progress (particularly if they are unbalanced)

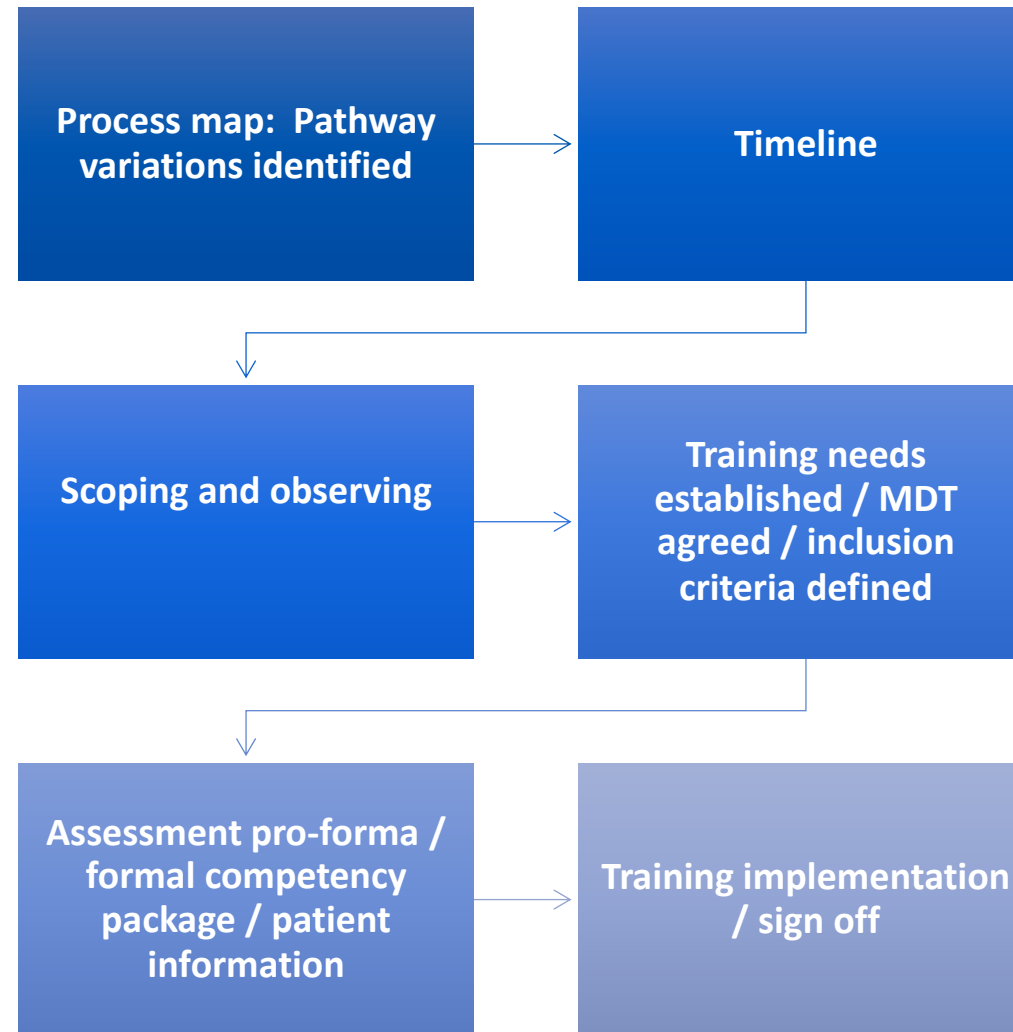
Conservative Care:

- Keep curves under this threshold until skeletal maturity is achieved.
- 

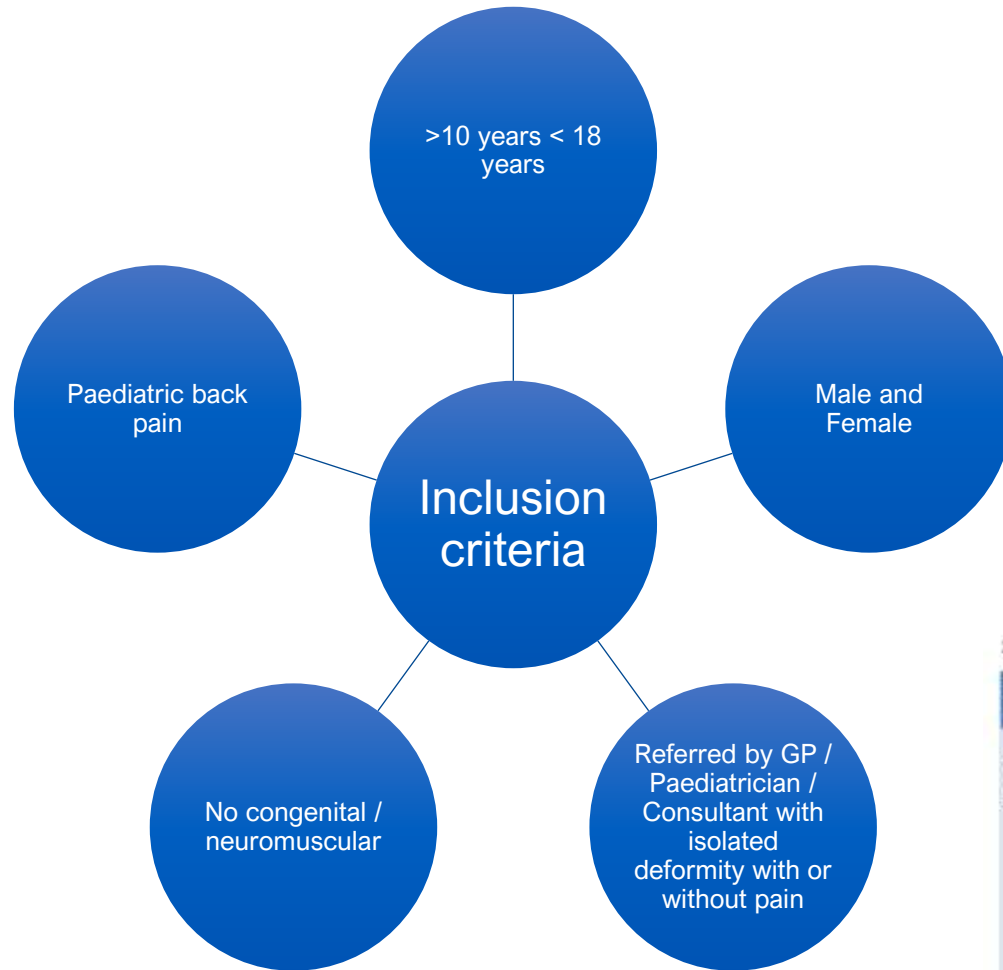
Pathway Evolution



Planning and Development



AIS APP Triage: Inclusion and Competency



Capability Framework: Clinical Practice
 Adolescent Spinal Pain, Scoliosis and Deformity
 NUH Advanced Physiotherapy Spinal Practitioner Team



1.41 Assessment

Domain / Knowledge	Competency	Professional Skills and Attitudes gained	Training to achieve this	Evidence / Assessment
Obtain accurate clinical history with signs and symptoms specific to Adolescents: <ul style="list-style-type: none"> Spinal Pain Scoliosis Deformity 	<ol style="list-style-type: none"> Ability to assess any referral within the setting inclusion criteria for adolescent spinal pain, scoliosis and deformity to determine spinal presentation. Extracts appropriate medical, psychosocial and medication history around presenting symptoms. Identifies the spectrum of severity of the symptoms and accurately records this. Demonstrate awareness of mental health and other vulnerabilities/risk factors that may impact on the presentation. 	<ol style="list-style-type: none"> Attention to detail and accuracy. Ability to obtain, interpret and justify clinical relevance of findings. Pattern recognition. Awareness of inclusion criteria. Sensitivity to adolescent patient group, parents and carers and any ethical issues. Awareness of social and cultural diversity. Attention to detail, information extraction. Accurate documentation. Utilisation of other agencies, respects for patient's rights. Safeguarding adolescents. 	<p>1000H</p> <ul style="list-style-type: none"> Adolescent clinic observation of Consultant / Fellow / Spinal APP (10-15 hours) (Total for all domains) Mandatory Training reflective account. 10 CEX assessments (direct observations) 10 CBD (reflective discussions) by include varied severity of all key pathologies (AS / LBP / Deformity) obtained by or discussed with Consultant / Fellow / Competent APP in this field. (Total for all domains) Clinical Networks / teaching. Reading of relevant literature / teaching 	

CLINICIAN NAME
 ROLE/LEVEL

Capabilities Framework for Advanced Physiotherapy Spinal Practitioner: Induction / Continued Practice

1.4 Clinical Practice: Adolescent Scoliosis and Deformity

Health care professionals working at the level of advanced clinical practice should be competent to do and provide competency evidence of the following:

Competency Achievement: Expert (E), Competent (C), Borderline (B) see p12

Domain	Competency Dimension	Evidence / Assessment (E/A)	Competency Achievement	Completed/ Verified/ Signed/ Dated
1.41 Assessment				
1.42 Examination				
1.43 Investigations				
1.44 Decision Making				
1.45 Management				

CLINICIAN NAME
 ROLE/LEVEL

AIS APP Triage: Data and Evaluation

**2022-2024
retrospective
data collection**



**Total AIS
presentations NP
and FU**

**% agreement
Cobb angle:
RISSER:
Management
plan**

Patient survey

**Clinic waiting
time**

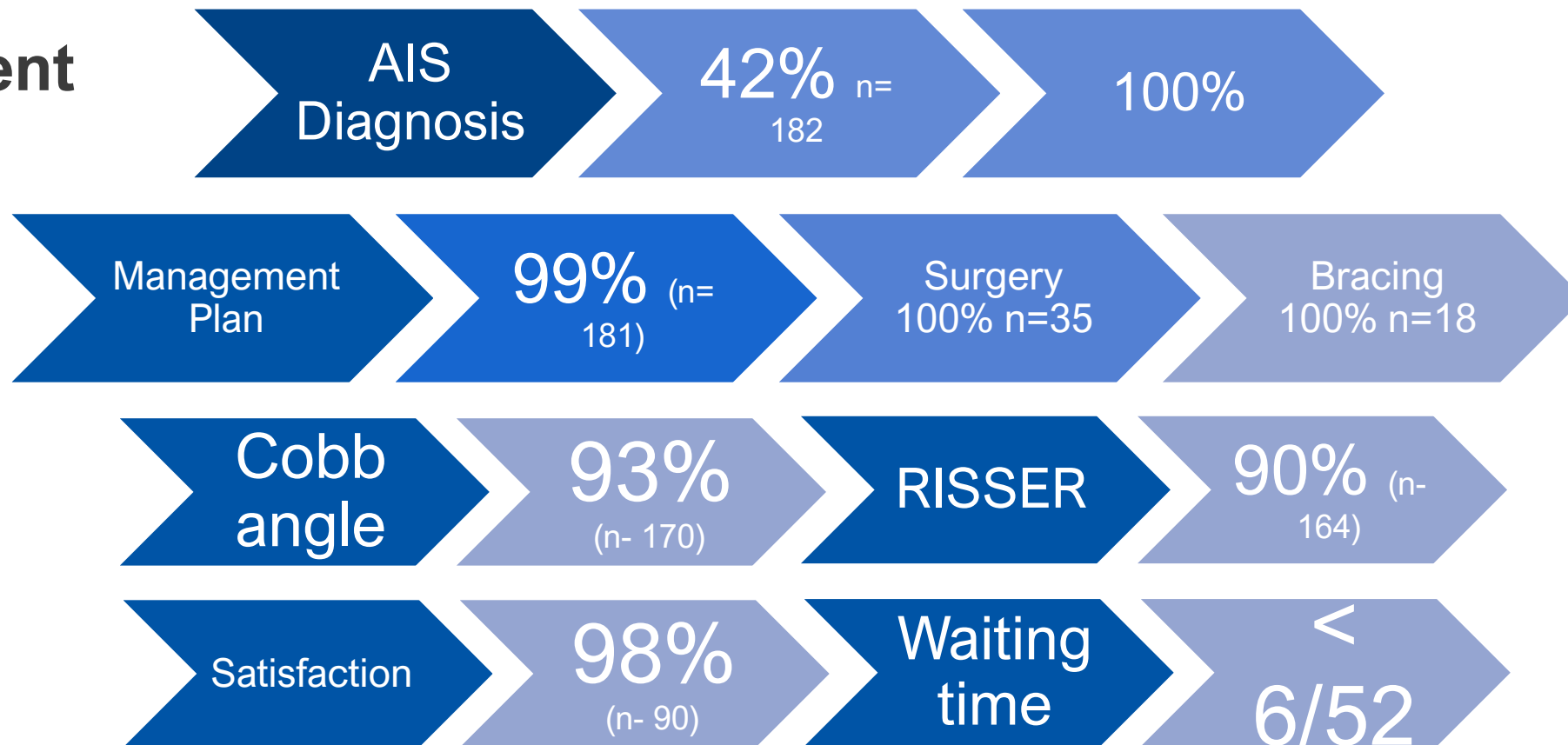
**Surgical
correction
listing**

**Conservative
management**

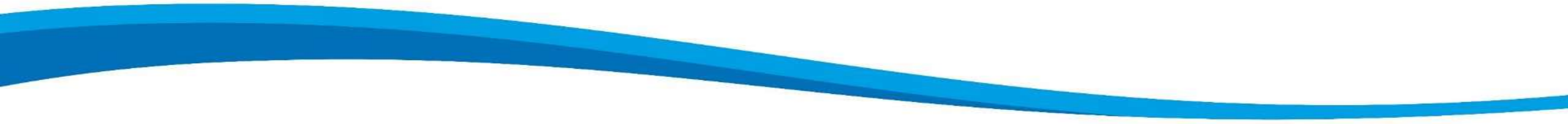
AIS APP Triage: Results

Total 714 patients reviewed (New n = 389: Follow up n= 325)

Agreement



AIS APP Triage: Today

- Demand vs capacity: 52% increased NP / 191% FU (2022-2024)
 - 2 x AIS APP
 - 4 days per week
 - Consultant MDT 2 x month
 - Joint APS APP and orthotic clinic
 - Continued data collection and service evaluation on all pathways
- 

Guidelines – Conservative Care of Scoliosis

SOSORT 2016 Guidelines

- Bracing is effective in halting curve progression in mild to moderate curves (20° - 40°)
- Physiotherapeutic Scoliosis-Specific Exercise (PSSE) alone, can prevent or limit curve progression in mild curves (under the bracing threshold), limiting the need for bracing
- When bracing is required, PSSE is suggested to improve brace compliance; facilitate spinal mobility for brace preparation; assist curve stabilisation during brace weaning



BSS Guidelines:

- Offer bracing to all patients 20-40 degree curves, risser 0-2, Apex T7 or below.
- Aim to fit brace within 8 weeks of referral



Boston vs Hyper Corrective Brace

Boston

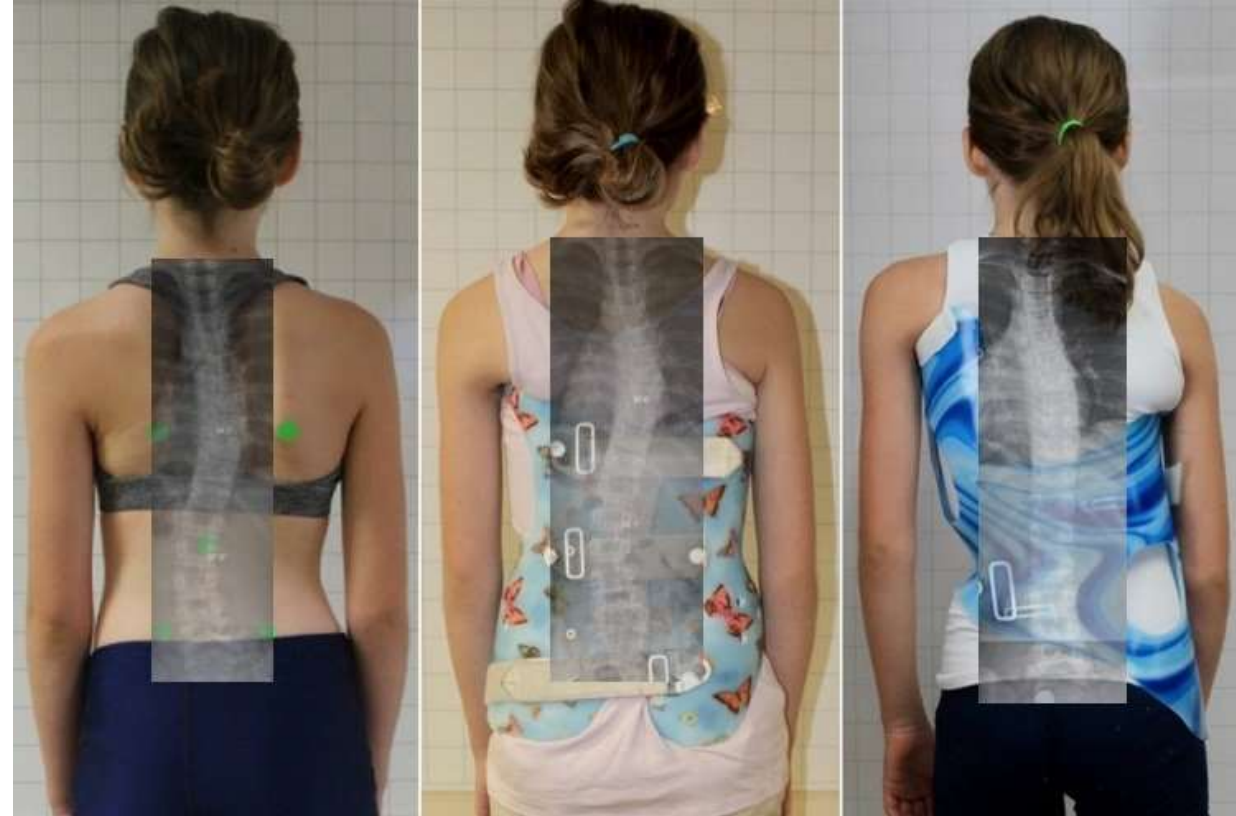
- Aims to halt progression
- Most prevalent in the NHS
- Casting process to manufacture (in-house)
- No cosmetic improvement

Hyper Corrective Brace

- Aims to achieve some correction
- Growing in popularity in the NHS
- Uses scanning technology to design and manufacture
- Often Outsourced to private providers (quicker referral to fit)
- Reduced conversion rate to surgery

(Sheffield/James Cook data suggests 80.5% - 91% will avoid surgery)

- Improved Cosmetic outcome



(Moramarco et. al, 2017)

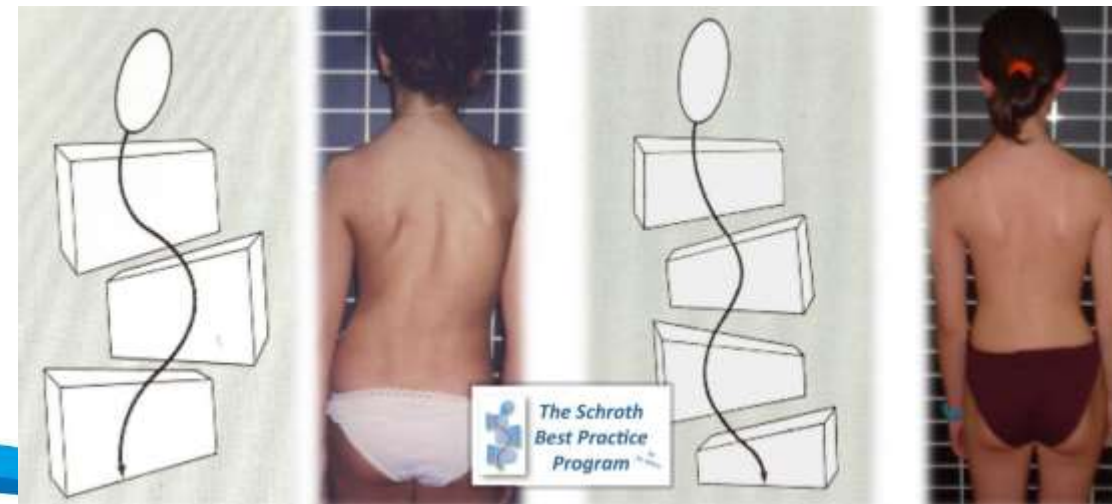
Physiotherapeutic Scoliosis Specific Exercise - PSSE

- PSSE is a form of Physiotherapy that involves exercises, aiming to lengthen out of the curve pattern and the strengthen the deep stabilisers of the spine in this corrected position
- Some evidenced base for halting progression (for idiopathic scoliosis)
- Excellent method for treating scoliotic related pain!

Schroth:

During the exercises, the aim is to restore:

- Side to side curves (using the system of correcting truncanal blocks)
- The side profile to re-create the 'S' shape
- De-rotational breathing to open up the concavity and encourage de-rotation of the rib cage



NUH practice – July 2022



- AIS patients referred for bracing inconsistently
- We offered 'Boston type' bracing only
- A lengthy wait from referral to fit – 5 to 6 months

= ↓ **confidence in our bracing pathway**

- Traditional Physio for pain only. No PSSE.

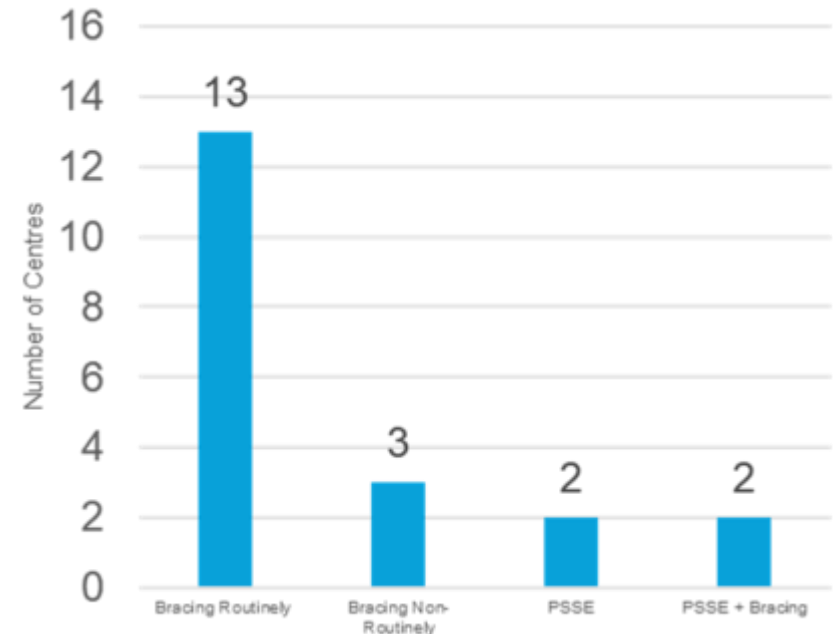
= **Failure to meet guidelines**

Other NHS Trusts

In 2022 we did a survey of conservative care practices across UK NHS centres:

- Most trusts were routinely bracing all appropriate patients within the guideline recommended time frame (81%)
- Many trusts were moving to hyper-corrective bracing
- Since then there has been a further increase in centres offering hypercorrective bracing as standard care:

- Sheffield Children's
- James Cook
- RNOH
- Glasgow
- Edinburgh
- Alder Hey Liverpool
- Leeds
- York

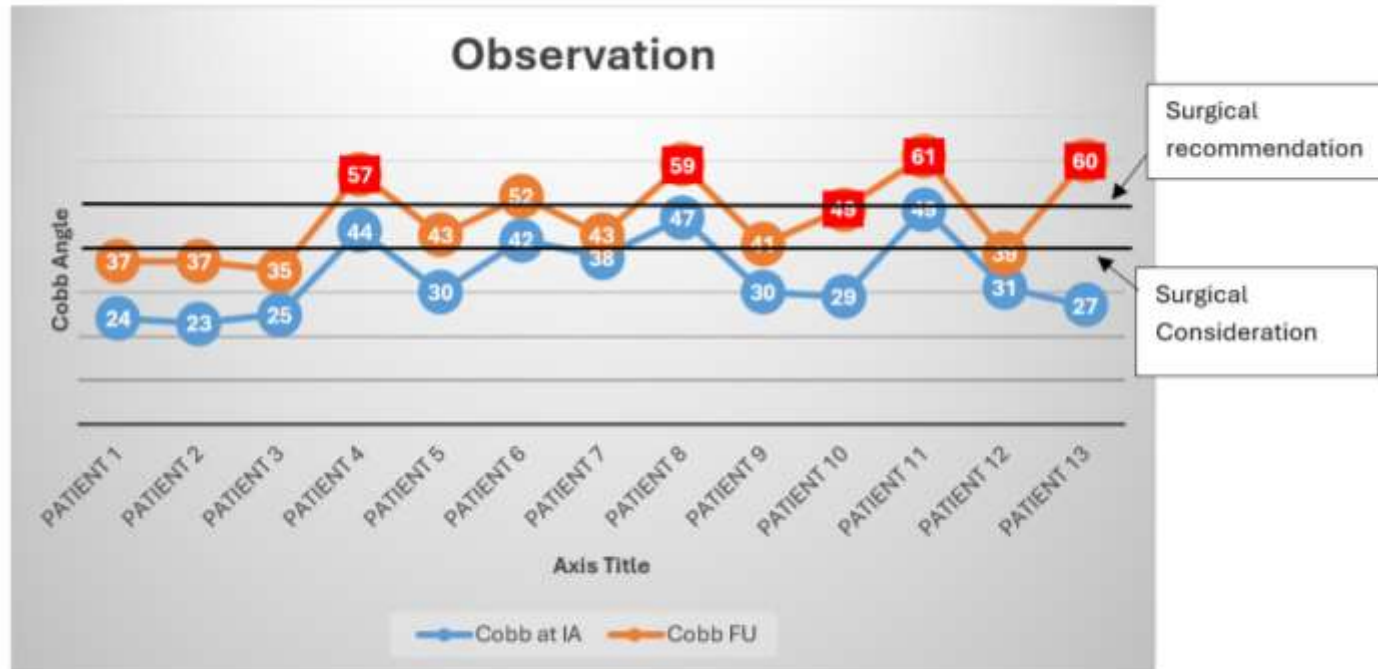


NUH to offer Hyper-Corrective Bracing



- x10 more expensive than Boston Bracing
- Gaining funds to support the move to hyper-corrective bracing has been challenging.
- An application to the NUH Charity for monies to pilot hyper-corrective bracing for AIS patients for 1 year, was approved in Feb 2024.
- The Digital and Procurement teams signed off the DPIA and contracts, in November 2024
- We are now nearly a year into the roll out of hyper-corrective braces

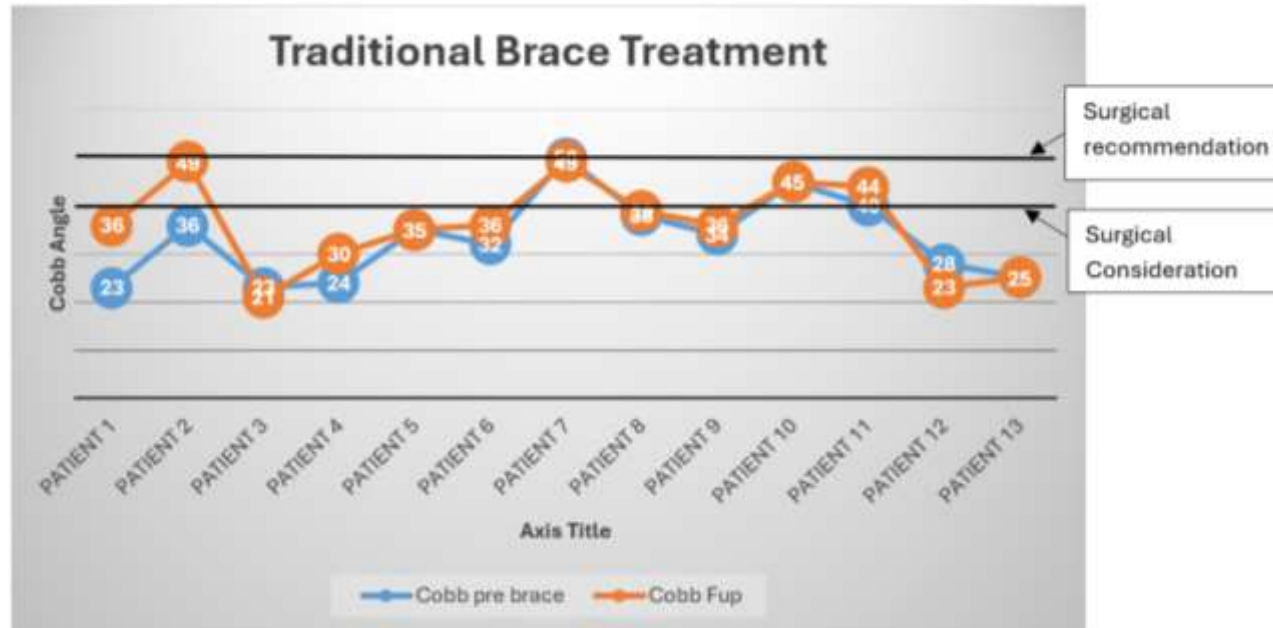
Growing AIS patients – No treatment



- Data from 3 years ago when referring for bracing not routine.
- 6/13 are now within surgical threshold
- 3 would be considered for surgery if patient appetite
- Remaining 4 in high 30's
- 69% of untreated patient are within surgical consideration

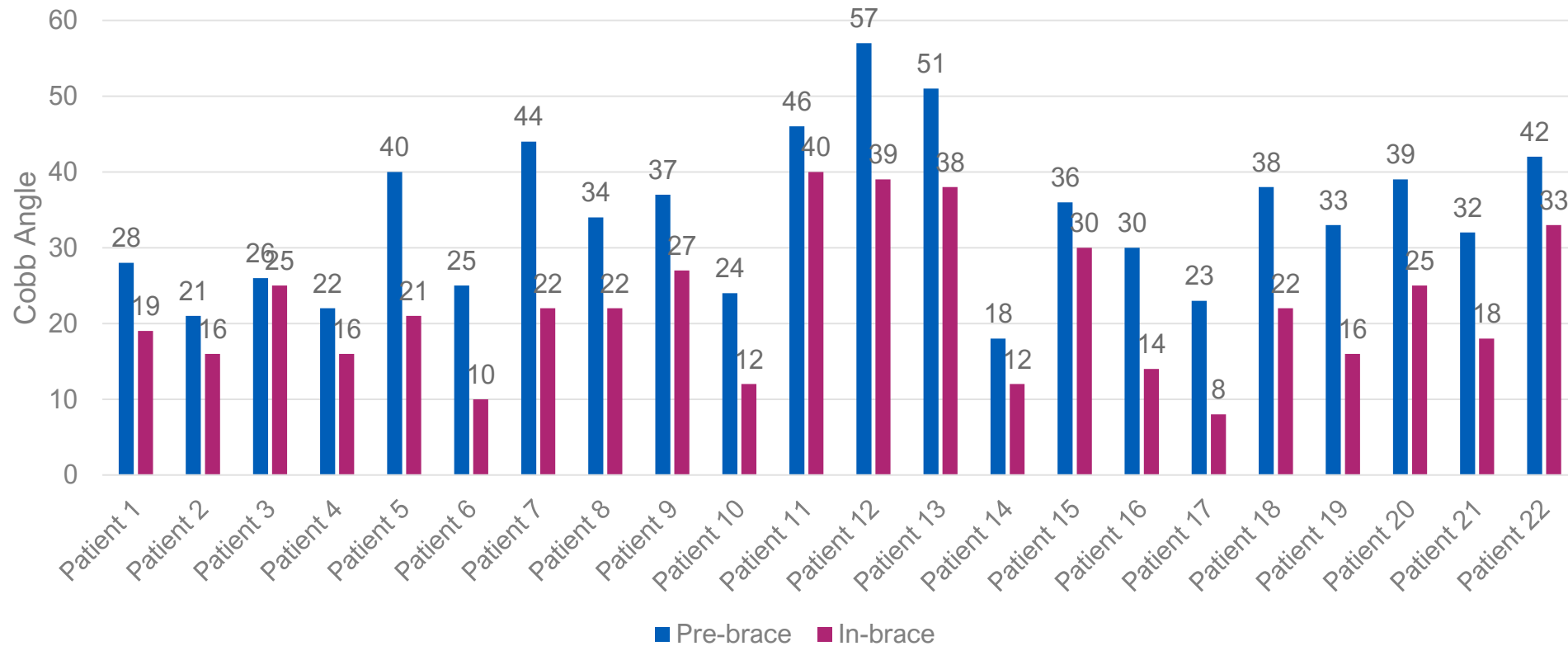
'Boston Type' Bracing at NUH

- 4/13 progressed $>5^\circ$ (30%)
 - Consistent with BrAIST trial findings



Hyper Corrective Braces

Pre-Brace Vs In-Brace Cobb Angles



PPIE

“ Getting seen for initial X ray and scan was far quicker than expected. Fitting the brace was a smooth process”

“I can see how much straighter the spine looks after I take the brace off after wearing it for a long period of time”

“We were able to see the brace in action after an in brace X-ray. My daughter was reassured that this was doing its job.”

“It is already evident that the brace is helping. Back pain is reduced and the back shape appears improved. As a family we are incredibly appreciative of the back brace and the correction it’s making. We have first hand experience of spinal fusion surgery for scoliosis and are grateful for a less invasive treatment option”

PPIE – Areas to improve

“Sleeping in it was hard for a couple of weeks”

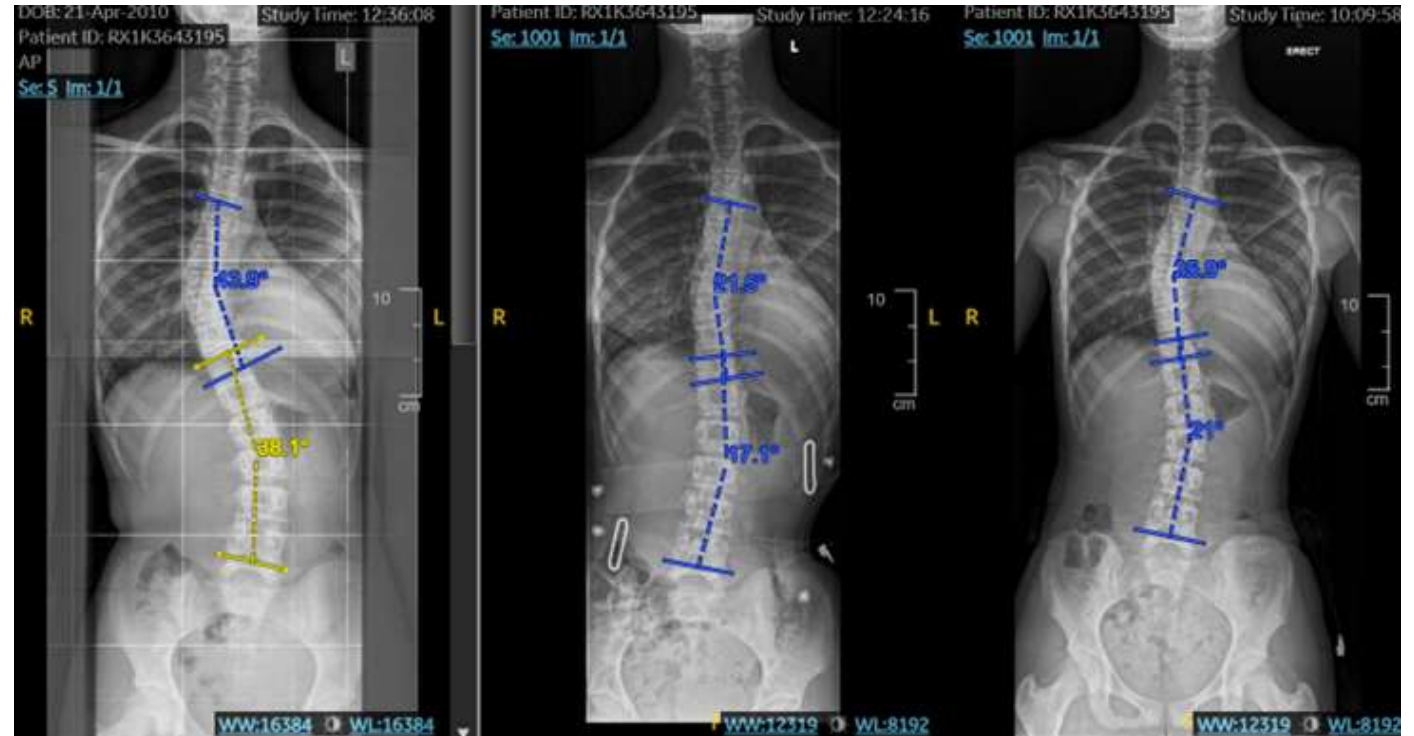
“It is very hard to get through on the phones and emails aren’t always picked up”

“There were red marks on the skin after wearing it, but after adjustment everything was ok. We believe it will help my son.”

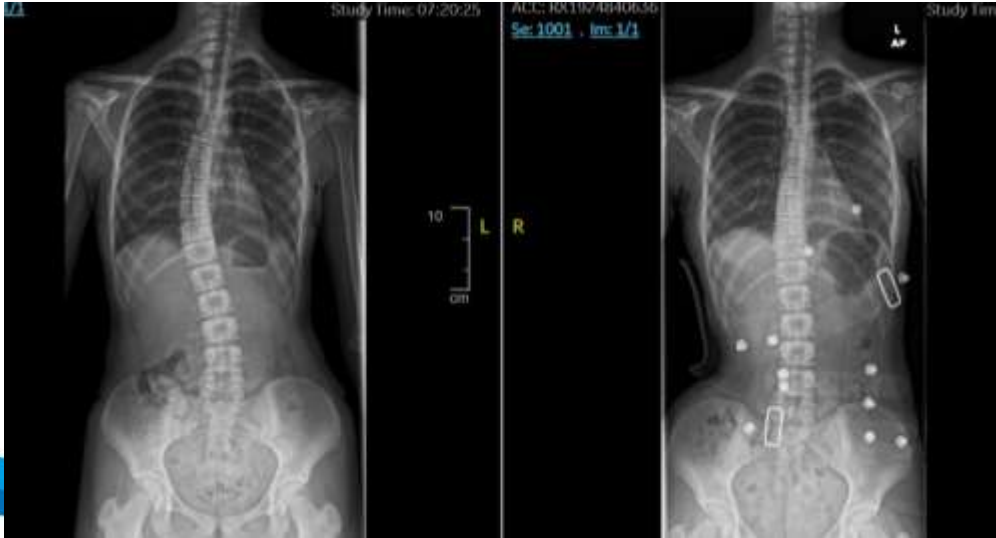
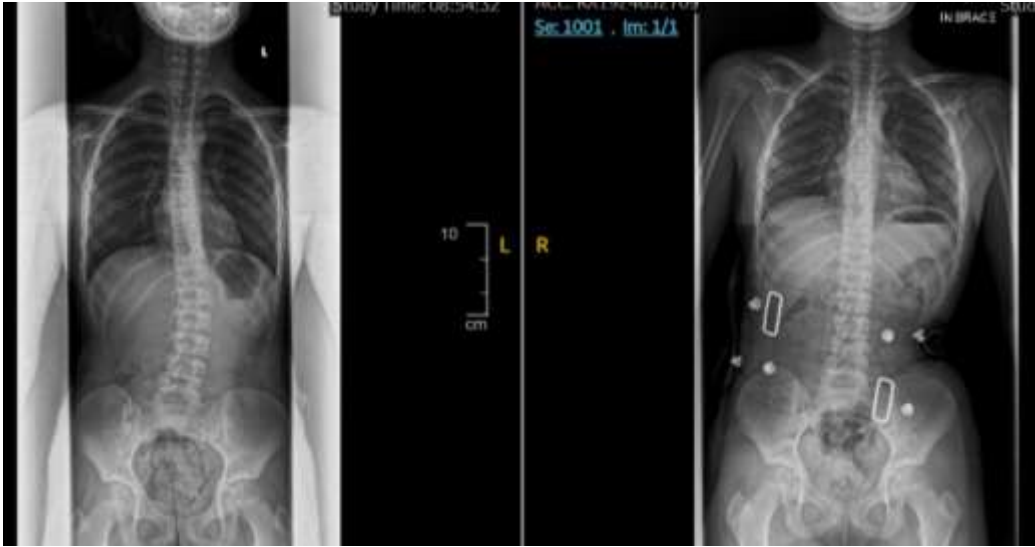
“Feeling self conscious about wearing the brace. It’s been quite a big change for an 11 year old. The brace has been adjusted to ease any discomfort”

Case study 1

- NUH patient in Private Hyper Corrective Brace
- Progression risk factor at the start of treatment = 100%
 - Cobb – (risser x3) / age
- She is now weaning out of her brace after 18/12 of treatment
- Cobb angle at her initial appointment were 44° and 38°.
- Out brace Cobb angles are now 26° and 21°



In-brace corrections

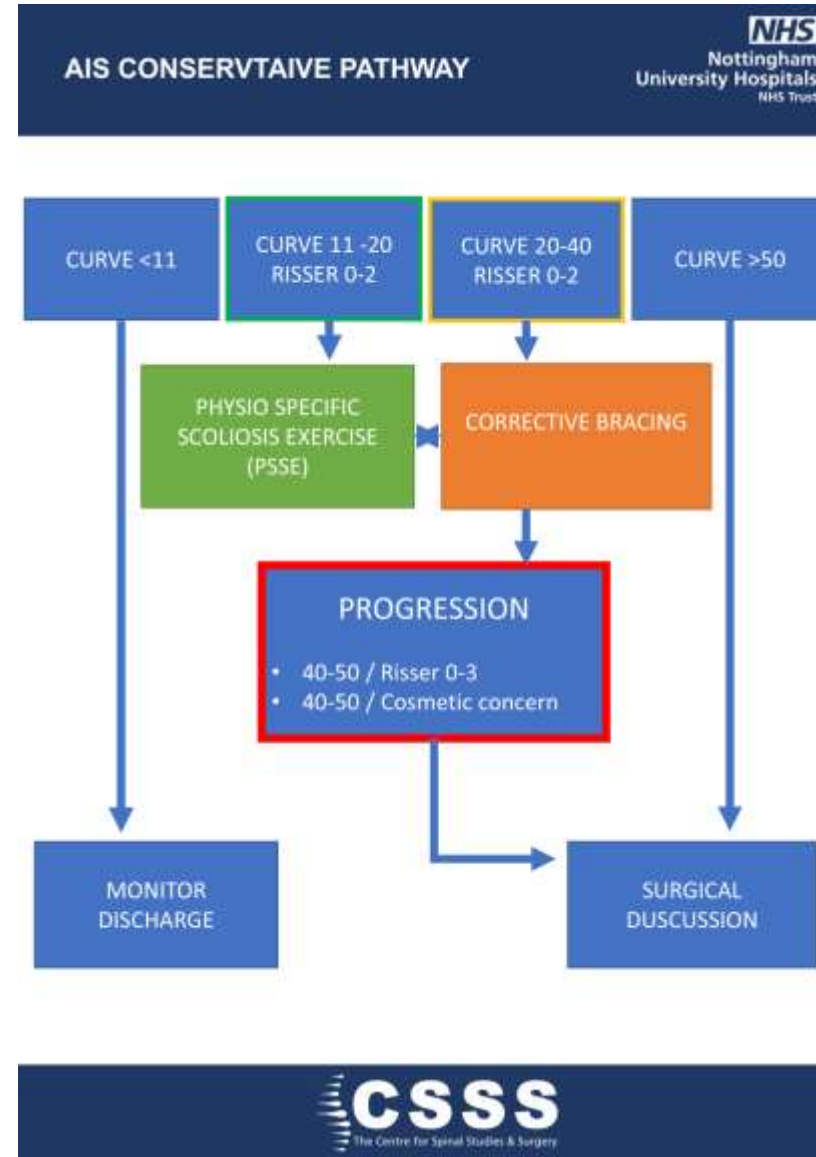


It's not all about the Cobb!



- London patient treated in Gensingen
- Huge cosmetic improvement
- Cobb reduced from 42° to 36°
- Only 6° improvement, but huge cosmetic improvement.
- This kind of result is not achievable with traditional Boston bracing!

New Pathway



Summary of benefits – Hyper corrective bracing

Quicker referral to fit (within guideline recommendations of 8/52)

Aims to improve magnitude of curves rather than just halting progression

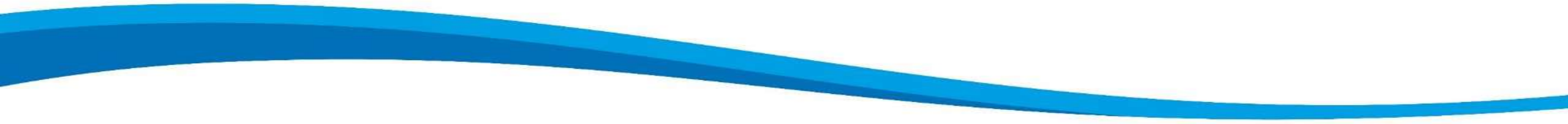
Seen as a positive change by patients and families

Improved cosmetic outcomes – potential benefits to mental health in our vulnerable adolescent patients

Potentially reduces the conversion to surgery rate in this cohort

Most patients are scanned for a brace in their initial clinic appointment = less appointments for the patient/missed school

Outsourcing of manufacturing has allowed our over-stretched Orthotic service the opportunity to see these patients in more timely fashion.



Thank You

