

## Supplementary Material

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**Table i.** Descriptive analysis of statements included in the Delphi survey Round 1. Green shading represents 'Consensus for', red shading represents 'Consensus against' and statements not shaded are those which did not reach consensus.

	BSCOS Respondents (n = 108)				
	n (%)				
	Strong recommendation <i>for</i>	Conditional recommendation <i>for</i>	Recommendation for research and possibly conditional recommendation for use restricted to trials	Conditional recommendation <i>against</i>	Strong recommendation <i>against</i>
<b>Screening and Surveillance</b>					
1. Some form of screening/surveillance should be undertaken to identify cases of DDH in babies.	102 (94)	4 (4)	1 (1)	0 (0)	1 (1)
2. In the context of the current delivery, the assessment of clinical instability at birth has low accuracy and alternative screening pathways should be considered.	46 (43)	29 (27)	25 (23)	7 (6)	1 (1)
3. In the context of the current delivery, universal neonatal clinical examination should be removed.	2 (2)	4 (4)	15 (14)	22 (20)	65 (60)
4. "Clicky hips" without instability (i.e. Barlow and Ortolani assessed to be normal) should be referred for a hip USS.	30 (28)	29 (27)	21 (19)	15 (14)	13 (12)

5. So called packaging disorders (torticollis; plagiocephaly; metatarsus adductus) should be included as risk factors for DDH.	42 (39)	36 (33)	22 (20)	4 (4)	4 (4)
6. First born females should be included as risk factors for DDH.	29 (27)	29 (27)	29 (27)	16 (15)	5 (5)
7. High birth weight females (> 4 kg) should be included as risk factors for DDH.	22 (20)	28 (26)	33 (31)	15 (14)	10 (9)
8. CTEV should be included as risk factors for DDH.	35 (32)	32 (30)	24 (22)	11 (10)	6 (6)
9. Foot deformities (non CTEV) should be included as risk factors for DDH.	30 (28)	45 (42)	22 (20)	8 (7)	3 (3)
10. The UK screening/surveillance program should involve universal ultrasound examination.	47 (44)	22 (20)	16 (15)	14 (13)	9 (8)
11. In the context of the UK screening programme, a 6 - 8 week clinical check in the community should be obligatory.	65 (60)	25 (23)	8 (7)	6 (6)	4 (4)
12. Children undergoing a hip USS must always have a clinical examination alongside the USS.	47 (44)	16 (15)	19 (18)	15 (14)	11 (10)
13. In a <i>universal</i> USS screening/surveillance program all hips can wait until 4-6 weeks for their USS?	28 (26)	26 (24)	22 (20)	18 (17)	14 (13)
14. In a <i>selective</i> USS screening/surveillance program all hips can wait until 4-6 weeks for their USS?	17 (16)	32 (30)	18 (17)	24 (22)	17 (16)
15. In a <i>selective</i> USS screening/surveillance program all children with abnormal neonatal examination must receive an USS by 2 weeks.	43 (40)	28 (26)	18 (17)	15 (14)	4 (4)
<b>Ultrasound</b>					
16. The Graf method of scanning using a cradle and probe holder should be mandatory for hip USS when using static scans.	31 (29)	37 (34)	21 (19)	6 (6)	13 (12)
17. The Graf criteria of standardised <i>reporting</i> should be employed in its unmodified form (Age/Useability/Description/Measurement/Classification).	34 (31)	38 (35)	19 (18)	8 (7)	9 (8)
18. In order to accurately measure the Alpha angle the <i>minimum</i> requirement of an acceptable coronal plane scan must include visualisation of a straight ilium, the acetabular labrum and the lower limb of the ischium (where the triradiate cartilage begins).	74 (69)	27 (25)	4 (4)	2 (2)	1 (1)
19. The core minimum criteria to be assessed and documented should include whether the hip is centred.	79 (73)	20 (19)	2 (2)	4 (4)	3 (3)

20. The core minimum criteria to be assessed and documented should include measurement of the alpha angle.	73 (68)	22 (20)	8 (7)	4 (4)	1 (1)
21. The core minimum criteria to be assessed and documented should include measurement of the beta angle.	15 (14)	28 (26)	35 (32)	19 (18)	11 (10)
22. The core minimum criteria to be assessed and documented should include <i>sonographic</i> dynamic test of stability.	48 (44)	29 (27)	16 (15)	12 (11)	3 (3)
23. The core minimum criteria to be assessed and documented should include the description of head coverage in terms of percentage.	35 (32)	30 (28)	27 (25)	10 (9)	6 (6)
<b>Initiation Of Brace Treatment</b>					
24. Babies who have had a screening ultrasound scan can be discharged, without examination, in the presence of a normal scan.	42 (39)	32 (30)	6 (6)	15 (14)	13 (12)
At 2 weeks of age or less, with an unstable hip on physical examination:					
25. The de-centred hip (equivalent Graf 3 or greater) should be treated.	84 (78)	16 (15)	3 (3)	4 (4)	1 (1)
26. The centred hip, alpha angle 43-49 (equivalent Graf 2c or D) should be treated.	55 (51)	27 (25)	14 (13)	8 (7)	4 (4)
27. The centred hip, alpha angle 50-59 (equivalent Graf 2a) should be treated.	14 (13)	15 (14)	21 (19)	23 (21)	35 (32)
At 2 weeks of age or less, with a stable hip on physical examination:					
28. The de-centred hip (equivalent Graf 3 or greater) should be treated.	69 (64)	18 (17)	9 (8)	9 (8)	3 (3)
29. The centred hip, alpha angle 43-49 (equivalent Graf 2c or D) should be treated.	39 (36)	19 (18)	19 (18)	18 (17)	13 (12)
30. The centred hip, alpha angle 50-59 (equivalent Graf 2a) should be treated.	1 (1)	3 (3)	13 (12)	35 (32)	56 (52)
At 5-7 weeks of age, with an unstable hip on physical examination:					
31. The de-centred hip (equivalent Graf 3 or greater) should be treated.	104 (96)	4 (4)	0 (0)	0 (0)	0 (0)
32. The centred hip, alpha angle 43-49 (equivalent Graf 2c or D) should be treated.	92 (85)	14 (13)	1 (1)	1 (1)	0 (0)
33. The centred hip, alpha angle 50-59 (equivalent Graf 2a) should be treated.	51 (47)	18 (17)	17 (16)	13 (12)	9 (8)
At 5-7 weeks of age, with a stable hip on physical examination:					

34. The de-centred hip (equivalent Graf 3 or greater) should be treated.	83 (77)	18 (17)	5 (5)	0 (0)	2 (2)
35. The centred hip, alpha angle 43-49 (equivalent Graf 2c or D) should be treated.	69 (64)	21 (19)	12 (11)	2 (2)	4 (4)
36. The centred hip, alpha angle 50-59 (equivalent Graf 2a) should be treated.	6 (6)	15 (14)	28 (26)	27 (25)	32 (30)
At 11-13 weeks of age, with an unstable hip on physical examination:					
37. The de-centred hip (equivalent Graf 3 or greater) should be treated.	97 (90)	7 (6)	0 (0)	1 (1)	3 (3)
38. The centred hip, alpha angle 43-49 (equivalent Graf 2c or D) should be treated.	96 (89)	8 (7)	2 (2)	1 (1)	1 (1)
39. The centred hip, alpha angle 50-59 (equivalent Graf 2b) should be treated.	78 (72)	14 (13)	8 (7)	6 (6)	2 (2)
At 11-13 weeks of age, with a stable hip on physical examination:					
40. The de-centred hip (equivalent Graf 3 or greater) should be treated.	88 (81)	9 (8)	4 (4)	4 (4)	3 (3)
41. The centred hip, alpha angle 43-49 (equivalent Graf 2c or D) should be treated.	80 (74)	13 (12)	10 (9)	2 (2)	3 (3)
42. The centred hip, alpha angle 50-59 (equivalent Graf 2b) should be treated.	32 (30)	23 (21)	25 (23)	14 (13)	14 (13)
<b>Hips Undergoing Brace Treatment</b>					
43. In a hip that is undergoing treatment in a harness/splint, once the hip is centred on ultrasound, the harness can be stopped, regardless of persistent dysplasia at that point.	0 (0)	4 (4)	15 (14)	35 (32)	54 (50)
44. In a hip that is undergoing treatment in a harness/splint, once the hip is centred on ultrasound, treatment should continue at least until the hip is sonographically mature (alpha >60).	53 (49)	37 (34)	11 (10)	7 (6)	0 (0)
45. Following full time harnessing/splinting, a period of weaning is required.	4 (4)	19 (18)	33 (31)	26 (24)	26 (24)
46. It is safe to re-commence splintage once femoral nerve palsy has resolved.	31 (29)	58 (54)	10 (9)	6 (6)	3 (3)
47. Hips that have been treated and normalised in a harness can be discharged with no further follow up.	2 (2)	1 (1)	13 (12)	24 (22)	68 (63)
<b>Quality, Governance and Research</b>					

48. A screening/surveillance program must be linked to paediatric orthopaedic service.	85 (79)	14 (13)	6 (6)	3 (3)	0 (0)
49. A one stop service (i.e. same day diagnosis & initiation of treatment) is gold standard.	88 (81)	16 (15)	3 (3)	0 (0)	1 (1)
50. There should be a quality assurance process for everyone performing clinical examination of baby hips.	82 (76)	18 (17)	7 (6)	1 (1)	0 (0)
51. A small group of expert examiners should be responsible for performing baby hip screening/surveillance in each maternity setting.	60 (56)	34 (31)	9 (8)	3 (3)	2 (2)
52. There should be a quality assurance process for everyone performing USS examination of baby hips.	89 (82)	17 (16)	2 (2)	0 (0)	0 (0)
53. Centres undertaking hip USS as part of a screening/surveillance must have a quality assurance system in place.	85 (79)	21 (19)	2 (2)	0 (0)	0 (0)
54. A trial of selective vs. universal USS screening/surveillance is warranted.	56 (52)	18 (17)	24 (22)	4 (4)	6 (6)
55. There should be a national data collection system for DDH, through which referrals and treatment outcomes should be routinely collected.	58 (54)	33 (31)	15 (14)	2 (2)	0 (0)
<b>56. De-centred hips put in a brace should be seen and scanned regularly within:</b>					
1 week				35 (32)	
2 weeks				61 (57)	
3 weeks				7 (7)	
4 weeks				2 (2)	
5 weeks				0 (0)	
6 weeks				3 (3)	
<b>57. Centred hips put in a brace should be seen and scanned regularly within:</b>					
1 week				10 (9)	
2 weeks				39 (36)	
3 weeks				13 (12)	
4 weeks				27 (25)	
5 weeks				0 (0)	
6 weeks				17 (16)	
8 weeks				2 (2)	
<b>58. Once the hip is centred, the harness/splint should be checked / adjusted at least every:</b>					
1 week				10 (9)	

2 weeks	52 (48)
3 weeks	14 (13)
4 weeks	13 (12)
According to clinical or parent needs	19 (18)
<b>59. Once a hip is centred then treatment should continue for a minimum:</b>	
0 weeks	7 (7)
2 weeks	10 (9)
4 weeks	22 (20)
6 weeks	58 (54)
8 weeks	5 (5)
10 weeks	6 (6)
<b>60. Hips that have been treated and normalised in a harness must be routinely followed at least until:</b>	
1 year	13 (12)
18 months	6 (6)
2 years	21 (19)
3 years	3 (3)
4 years	6 (6)
5 years	17 (16)
Walking age with normal radiographs	42 (39)

BSCOS, British Society for Children's Orthopaedic Surgery; CTEV, congenital talipes equinovarus; DDH, developmental dysplasia of the hip; USS, ultrasound scan.

**Table ii.** Descriptive analysis of statements included in the Delphi survey Round 2. Shading is as in Table i.

	<b>BSCOS respondents (n=111)</b>				
	<b>n (%)</b>				
	<b>Strong recommendation <i>for</i></b>	<b>Conditional recommendation <i>for</i></b>	<b>Recommendation for research and possibly conditional recommendation for use restricted to trials</b>	<b>Conditional recommendation <i>against</i></b>	<b>Strong recommendation <i>against</i></b>
<b>Screening and Surveillance</b>					
1. The assessment of clinical instability at birth has low accuracy and alternative screening pathways should be considered.	61 (55)	25 (23)	19 (17)	3 (3)	3 (3)
2. "Clicky hips" without instability (i.e. Barlow and Ortolani assessed to be normal) should be referred for a hip USS.	47 (42)	31 (28)	17 (15)	9 (8)	7 (6)
3. So called packaging disorders (torticollis; plagiocephaly; metatarsus adductus) should be included as risk factors for DDH.	72 (64)	26 (23)	8 (7)	3 (3)	2 (2)
4. First born females should be included as risk factors for DDH.	42 (38)	27 (24)	31 (28)	4 (4)	7 (6)
5. High birth weight females (> 4 kg) should be included as risk factors for DDH.	23 (21)	22 (20)	51 (46)	9 (8)	6 (5)
6. CTEV should be included as risk factors for DDH.	46 (41)	30 (27)	16 (14)	13 (12)	6 (5)
7. Foot deformities (non CTEV) should be included as risk factors for DDH.	38 (34)	52 (47)	12 (11)	6 (5)	3 (3)
8. The UK screening/surveillance program should involve universal ultrasound examination.	70 (63)	16 (14)	13 (12)	8 (7)	4 (4)
9. Children undergoing a hip USS must always have a clinical examination alongside the USS.	64 (58)	14 (13)	14 (13)	14 (13)	5 (5)
10. In a universal USS screening/surveillance program all hips can wait until 4-6 weeks for their USS?	44(40)	29 (26)	11 (10)	14 (13)	13 (12)
11. In a selective USS screening/surveillance program all hips can wait until 4-6 weeks for their USS?	25 (23)	44 (40)	7 (6)	24 (22)	11 (10)

12. In a selective USS screening/surveillance program all children with abnormal neonatal examination must receive an USS by 2 weeks.	63 (57)	29 (26)	7 (6)	6 (5)	6 (5)
<b>Ultrasound</b>					
13. The Graf method of scanning using a cradle and probe holder should be mandatory for hip USS when using static scans.	40 (36)	34 (31)	16 (14)	7 (6)	14 (13)
14. The Graf criteria of standardised reporting should be employed in its unmodified form (Age/Useability/Description/Measurement/Classification).	30 (27)	54 (49)	12 (11)	7 (6)	8 (7)
15. The core minimum criteria to be assessed and documented must always include whether the hip is centred.	102 (92)	7 (6)	2 (2)	0 (0)	0 (0)
16. The core minimum criteria to be assessed and documented must always include measurement of the alpha angle.	95 (86)	7 (6)	5 (5)	2 (2)	2 (2)
17. The core minimum criteria to be assessed and documented must always include measurement of the beta angle.	8 (7)	17 (15)	61 (55)	10 (9)	15 (14)
18. The core minimum criteria to be assessed and documented must always include sonographic dynamic test of stability i.e. an ultrasound stress test.	68 (61)	24 (22)	8 (7)	4 (4)	7 (6)
19. The core minimum criteria to be assessed and documented must always include the description of head coverage in terms of percentage.	51 (46)	26 (23)	22 (20)	5 (5)	7 (6)
<b>Initiation Of Treatment In A Harness/Splint</b>					
20. Babies who have had a screening ultrasound scan can be discharged, without examination, in the presence of a normal scan.	72 (65)	23 (21)	6 (5)	3 (3)	7 (6)
<b>At 2 weeks of age or less, with an unstable hip on physical examination:</b>					
21. The centred hip, alpha angle 50–59 (equivalent Graf 2a), should not be immediately treated, but a staged re-scan should occur.	56 (51)	28 (25)	10 (9)	8 (7)	9 (8)
22. The centred hip, alpha angle 50–59 (equivalent Graf 2a) should be treated.	11 (10)	9 (8)	13 (12)	26 (23)	52 (47)
<b>At 2 weeks of age or less, with a stable hip on physical examination:</b>					



23. The centred hip, alpha angle 43-49 (equivalent Graf 2c or D), should not be immediately treated, but a staged re-scan should occur.	21 (19)	33 (30)	19 (17)	11 (10)	27 (24)
24. The centred hip, alpha angle 43-49 (equivalent Graf 2c or D) should be treated.	45 (41)	26 (23)	13 (12)	16 (14)	11 (10)
<b>At 5-7 weeks of age, with a stable hip on physical examination:</b>					
25. The centred hip, alpha angle 50-59 (equivalent Graf 2a), should not be immediately treated, but a staged re-scan should occur.	47 (42)	35 (32)	13 (12)	12 (11)	4 (4)
26. The centred hip, alpha angle 50-59 (equivalent Graf 2a) should be treated.	3 (3)	14 (13)	19 (17)	26 (23)	49 (44)
<b>At 11-13 weeks of age, with a stable hip on physical examination:</b>					
27. The centred hip, alpha angle 50-59 (equivalent Graf 2b) should be treated.	67 (60)	14 (13)	17 (15)	8 (7)	5 (5)
<b>Hips Undergoing Treatment In A Harness/Splint</b>					
28. Following full time harnessing/splinting, a period of weaning is required.	4 (4)	8 (7)	41 (37)	11 (10)	47 (42)
<b>Quality, Governance and Research</b>					
29. A trial of selective vs. universal USS screening/surveillance is warranted.	80 (72)	10 (9)	12 (11)	5 (5)	4 (4)
30. De-centred hips treated in a harness / splint should be seen and scanned within:					
1 week			18 (16)		
2 weeks			89 (80)		
3 weeks			3 (3)		
4 weeks			1 (1)		
5 weeks			0 (0)		
6 weeks			0 (0)		
31. Centred hips treated in a harness / splint should be scanned at the following intervals:					
1 week			3 (3)		
2 weeks			51 (46)		
3 weeks			8 (7)		
4 weeks			31 (28)		
5 weeks			0 (0)		

6 weeks	17 (15)
8 weeks	1 (1)
32. Centred hips treated in a harness / splint should be seen for harness / splint adjustment at the following intervals:	
1 week	17 (15)
2 weeks	69 (62)
3 weeks	7 (6)
4 weeks	8 (7)
According to clinical or parent needs	10 (9)
33. A de-centred hip that fails to centre should have the harness / splint discontinued within:	
1 week	9 (8)
2 weeks	55 (50)
3 weeks	28 (25)
4 weeks	18 (16)
5 weeks	0 (0)
6 weeks	1 (1)
34. Once a hip is centred then treatment should continue for a minimum:	
0 weeks	2 (2)
2 weeks	3 (3)
4 weeks	13 (12)
6 weeks	80 (72)
8 weeks	5 (5)
10 weeks	2 (2)
12 weeks	6 (5)
35. Hips that have been treated and normalised in a harness must be routinely followed at least until:	
1 year	5 (5)
18 months	3 (3)
2 years	20 (18)
3 years	2 (2)
4 years	3 (3)
5 years	18 (16)
Walking age and with normal radiographs	60 (54)

BSCOS, British Society for Children's Orthopaedic Surgery; CTEV, congenital talipes equinovarus; DDH, developmental dysplasia of the hip; USS, ultrasound scan.