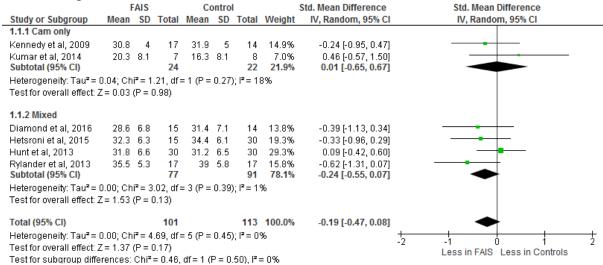
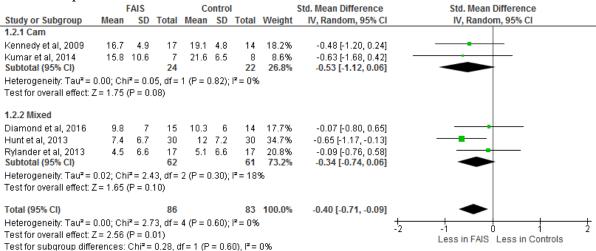
Supplementary C: Subgroup analysis of cam only FAIS cohorts and of studies with cohorts of a variety of morphologies "mixed FAIS" (cam, pincer and cam + pincer) compared with controls for hip kinematics and joint torques

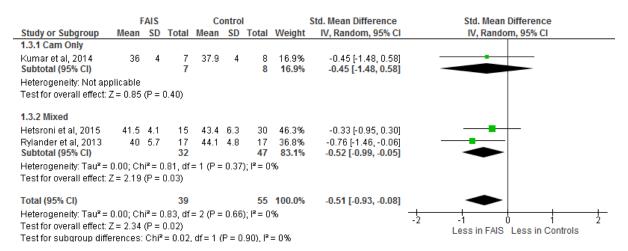
1.1 Peak Hip Flexion in Stance



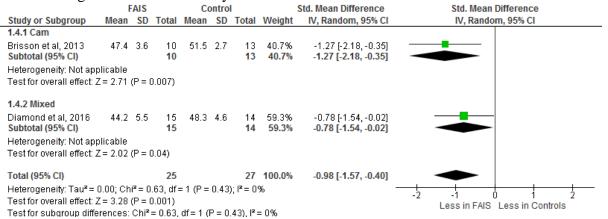
1.2 Peak Hip Extension in Stance



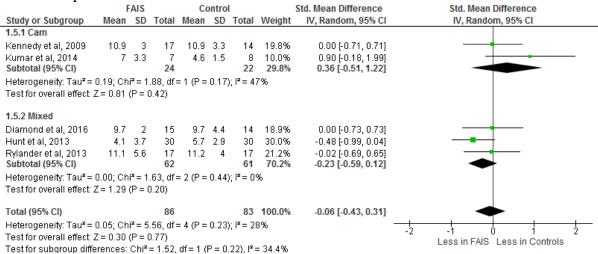
1.3 Total Sagittal Plane ROM in Stance



1.4 Total Sagittal Plane ROM in Cycle



1.5 Peak Hip Adduction in Stance



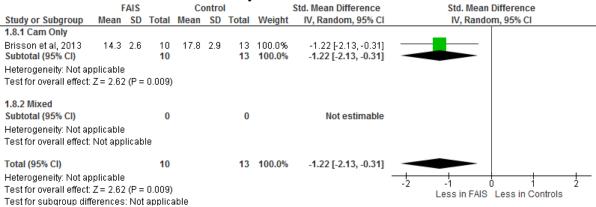
1.6 Peak Hip Abduction in Stance

1	F	AIS		Co	ontro	I	!	Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
1.6.1 Cam									
Kennedy et al, 2009	1.4	3.3	17	4	3.6	14	21.9%	-0.74 [-1.47, -0.00]	-
Subtotal (95% CI)			17			14	21.9%	-0.74 [-1.47, -0.00]	
Heterogeneity: Not app	olicable								
Test for overall effect: 2	Z = 1.97	(P =	0.05)						
1.6.2 Mixed									
Hetsroni et al, 2015	5.2	2.7	15	4 4	2.9	30	25.5%	0.28 [-0.35, 0.90]	
Hunt et al. 2013	2	3	30		2.8	30	29.7%	-0.07 [-0.57, 0.44]	
Rylander et al. 2013	-1.1	5	17		3.3	17	22.9%	-0.76 [-1.46, -0.06]	
Subtotal (95% CI)			62			77	78.1%	-0.16 [-0.70, 0.38]	-
Heterogeneity: Tau ² = 1	0.13; Ch)j² = 4	l.82, df	= 2 (P =	0.09); l ² = 5	9%		
Test for overall effect: 2	Z = 0.57	(P=	0.57)						
Total (95% CI)			79			91	100.0%	-0.29 [-0.77, 0.20]	→
Heterogeneity: Tau ² = 1	0.14; Ch	11 2 = 8	6.98, df	= 3 (P =	0.07); I ² = 5	7%		-2 -1 1 2
Test for overall effect: 2	Z = 1.16	(P =	0.25)						Less in FAIS Less in Controls
Test for subgroup diffe	rences:	Chi²	= 1.54	. df = 1 (P = 0	.21), I²	= 35.1%		

1.7 Total Frontal Plane ROM in stance

	F	AIS		Co	ntro	l		Std. Mean Difference	Std. Mean Difference			
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI			
1.7.1 Cam												
Kumar et al, 2014 Subtotal (95% CI)	10.4	1.9	7 7	10.3	1.8	8 8	17.9% 17.9%	0.05 [-0.96, 1.07] 0.05 [-0.96, 1.07]				
Heterogeneity: Not app	licable											
Test for overall effect: Z	Z = 0.10	(P = 0	0.92)									
1.7.2 Mixed												
Diamond et al, 2016	13.9	3.2	15	15.1	3.6	14	25.8%	-0.34 [-1.08, 0.39]				
Hetsroni et al, 2015	13.1	3.8	15	12.6	4	30	30.0%	0.12 [-0.50, 0.75]	- -			
Rylander et al, 2013 Subtotal (95% CI)	10	2.2	17 47	13.4	4.1	17 61	26.3% 82.1%	-1.01 [-1.73, -0.29] - 0.39 [-1.05, 0.27]				
Heterogeneity: Tau² = 0 Test for overall effect: 2	•			= 2 (P =	0.06)	; l = 6:	3%					
restror overall effect. 2	1.10	(r – t	0.20)									
Total (95% CI)			54			69	100.0%	-0.31 [-0.84, 0.23]	-			
Heterogeneity: Tau² = (0.15; Ch	i² = 6	.01, df:	= 3 (P =	0.11)	; l² = 5l	0%		-2 -1 1 1 2			
Test for overall effect: 2 Test for subgroup diffe		•	,	df = 1 (l	P = 0.	47), l² :	= 0%		Less in FAIS Less in controls			

1.8 Total Frontal Plane ROM in Gait Cycle



1.9 Peak Hip Internal Rotation in stance

	F		Co	ontro	I		Std. Mean Difference	Std. Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI	
1.9.1 Cam										
Subtotal (95% CI)			0			0		Not estimable		
Heterogeneity: Not ap	plicable									
Test for overall effect:	Not appl	icabl	В							
1.9.2 Mixed										
Diamond et al, 2016	0.4	5.3	15	1	6	14	29.4%	-0.10 [-0.83, 0.63]		
Hunt et al, 2013	3.1	4.2	30	8.2	5.8	30	39.9%	-0.99 [-1.53, -0.46]		
Rylander et al, 2013	6.5	5.6	17	11	5.4	17	30.7%	-0.80 [-1.50, -0.10]		
Subtotal (95% CI)			62			61	100.0%	-0.67 [-1.19, -0.15]	•	
Heterogeneity: Tau ² =	0.10; Ch	j = 3	.79, df:	= 2 (P =	0.15); $I^z = 4$	7%			
Test for overall effect:	Z= 2.55	(P = I	0.01)							
Total (95% CI)			62			61	100.0%	-0.67 [-1.19, -0.15]	•	
Heterogeneity: Tau ² =	0.10; Ch	i² = 3	.79, df	= 2 (P =	0.15	$); l^2 = 4$	7%		-5 -1 1 1 5	
Test for overall effect: .	Z = 2.55	(P = I	0.01)						Less in FAIS Less in Controls	
Test for subgroup diffe	erences:	Not a	applica	ble					Less III AIG Less III Collidos	

1.10 Peak Hip External Rotation in Stance

•	F	AIS		C	ontrol			Std. Mean Difference	Std. Mean Difference	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI	
1.10.1 Cam										
Kumar et al, 2014	4.6	5.9	7	7.7	4.2	8	9.6%	-0.58 [-1.62, 0.47]		
Subtotal (95% CI)			7			8	9.6%	-0.58 [-1.62, 0.47]		
Heterogeneity: Not ap	plicable									
Test for overall effect:	Z = 1.08	(P =	0.28)							
1.10.2 Mixed										
Hetsroni et al, 2015	14.8	8.9	15	15.1	13.3	30	27.2%	-0.02 [-0.64, 0.60]		
Hunt et al, 2013	9.7	7.8	30	7.1	7.7	30	40.3%	0.33 [-0.18, 0.84]	 •	
Rylander et al, 2013	4.7	5.6	17	3	5.2	17	22.9%	0.31 [-0.37, 0.98]		
Subtotal (95% CI)			62			77	90.4%	0.22 [-0.12, 0.56]	◆	
Heterogeneity: Tau ² =	0.00; Ch	ni² = C).84, df	= 2 (P =	0.66);	I ² = 09	6			
Test for overall effect:	Z = 1.25	(P =	0.21)							
Total (95% CI)			69			85	100.0%	0.14 [-0.18, 0.46]	•	
Heterogeneity: Tau ² =	0.00; Ch	ni z = 2	2.86, df	= 3 (P =	0.41);	2 = 09	6			Ť
Test for overall effect:	Z = 0.86	(P =	0.39)	•					-2 -1 0 1 Less in FAIS Less in Controls	2
Test for subgroup diffe	erences:	Chi ²	= 2.02	df = 1.6	P = 0.1	16). I²=	50.5%		Less III FAIS Less III Controls	

1.11 Total Transverse Plane ROM in Stance

	F	AIS		Co	ontro	I		Std. Mean Difference		Std. Mean Difference	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI		IV, Random, 95% CI	
1.11.1 Cam											
Brisson et al, 2013	15.7	3.7	10	15.5	2.7	13		Not estimable			
Kumar et al, 2014	10.4	1.9	7	10.3	1.8	8	23.2%	0.05 [-0.96, 1.07]			
Subtotal (95% CI)			7			8	23.2%	0.05 [-0.96, 1.07]			
Heterogeneity: Not app	olicable										
Test for overall effect: 2	Z = 0.10	(P = 0)	0.92)								
1.11.2 Mixed											
Diamond et al, 2016	12.9	3.2	15	11.8	5.3	14		Not estimable			
Hetsroni et al, 2015	12.9	3.2	15	11.8	5.3	30	40.4%	0.23 [-0.39, 0.85]			
Rylander et al, 2013	11.3	3.5	17	14	4.4	17	36.5%	-0.66 [-1.36, 0.03]			
Subtotal (95% CI)			32			47	76.8%	-0.20 [-1.08, 0.67]			
Heterogeneity: Tau² = (= 1 (P =	0.06	$); I^2 = 7;$	2%				
Test for overall effect: 2	Z = 0.46	(P = 0)	0.65)								
Total (95% CI)			39			55	100.0%	-0.14 [-0.73, 0.45]			
Heterogeneity: Tau² = (0.12; Ch	i = 3	.68, df:	= 2 (P =	0.16	$ \cdot ^2 = 41$	6%		-2	 	
Test for overall effect: Z	Z = 0.46	(P = 0)	0.65)						-2	Less in FAIS Less in Controls	2
Test for subgroup diffe	rences:	Chi²	= 0.14.	df = 1 (1	P = 0	71), P:	= 0%			2000 1117/10 2000 111 001111013	

1.12 Total Transverse Plane ROM in Cycle

	F	AIS		Co	ontro	l		Std. Mean Difference	Std. Mean Difference	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI	
1.12.1 Cam										
Brisson et al, 2013 Subtotal (95% CI)	15.7	3.7	10 10	15.5	2.7	13 13	44.0% 44.0 %	0.06 [-0.76, 0.89] 0.06 [-0.76, 0.89]		
Heterogeneity: Not app	licable									
Test for overall effect: Z	= 0.14	(P = 0)	0.88)							
1.12.2 Mixed Diamond et al, 2016 Subtotal (95% CI) Heterogeneity: Not app Test for overall effect: Z			15 15 0.61)	13	5.1	14 14	56.0% 56.0 %	-0.19 [-0.92, 0.54] -0.19 [-0.92, 0.54]		
Total (95% CI) Heterogeneity: Tau ² = 0 Test for overall effect: Z Test for subgroup differ	= 0.29	(P = 0	0.77)	,); I² = 0°		-0.08 [-0.63, 0.47]	-2 -1 0 1 Less in FAIS Less in Controls	

1.13 Peak Hip Flexion Torque in Stance

	FAIS			C	ontrol			Std. Mean Difference	Std. Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI		
1.13.1 Cam Only											
Brisson et al, 2013	0.66	0.13	10	0.7	0.15	13	15.2%	-0.27 [-1.10, 0.56]			
Kumar et al, 2014	1.02	0.22	7	1.17	0.17	8	9.9%	-0.73 [-1.78, 0.33]			
Subtotal (95% CI)			17			21	25.1%	-0.44 [-1.10, 0.21]			
Heterogeneity: Tau ² =	0.00; Ch	i ^z = 0.4	44, df=	1 (P = 0)	i.51); F	² =0%					
Test for overall effect:	Z = 1.33	(P = 0.	.18)								
1.13.2 Mixed											
Diamond et al, 2016	7.1	3.2	15	6.4	4.1	14	18.7%	0.19 [-0.54, 0.92]	- • -		
Hunt et al, 2013	0.48	0.15	30	0.56	0.16	30	31.4%	-0.51 [-1.02, 0.01]			
Samaan et al, 2016	1.36	0.26	15	1.29	0.39	34	24.8%	0.19 [-0.42, 0.80]	 •		
Subtotal (95% CI)			60			78	74.9%	-0.08 [-0.58, 0.41]	-		
Heterogeneity: Tau² =	0.09; Ch	ii = 3.8	39, df=	2(P = 0)	l.14); F	² = 49%	5				
Test for overall effect: :	Z = 0.33	(P = 0.	.74)								
Total (95% CI)			77			99	100.0%	-0.19 [-0.54, 0.16]	•		
Heterogeneity: Tau ² =	0.03; Ch	i² = 5.0	04, df=	4 (P = 0)	i.28); F	² = 21%					
Test for overall effect: :				•					-2 -1 0 1 2 Less in FAIS Less in Controls		
Test for subaroup diffe	erences:	Chi²=	0.75 0	f = 1 (P	= 0.39	a) i² = 0	196		Less III FAIG Less III Controls		

Test for subgroup differences: Chi² = 0.75, df = 1 (P = 0.39), i² = 0% 1.14 Peak Hip Extension Torque in Stance

		FAIS			ontrol			Std. Mean Difference	Std. Mean Difference			
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI			
1.14.1 Cam Only												
Brisson et al, 2013	0.98	0.23	10	1.05	0.31	13	13.5%	-0.24 [-1.07, 0.59]				
Kumar et al, 2014	0.71	0.19	7	0.83	0.1	8	8.2%	-0.76 [-1.82, 0.30]				
Subtotal (95% CI)			17			21	21.7%	-0.44 [-1.09, 0.22]				
Heterogeneity: Tau² = 0	0.00; Ch	$i^2 = 0.5$	57, df=	1 (P = 0)	1.45); P	² = 0%						
Test for overall effect: 2	Z = 1.31	(P = 0.	19)									
1.14.2 Mixed												
Diamond et al, 2016	4.3	2.2	15	5	2.3	14	17.3%	-0.30 [-1.04, 0.43]				
Hunt et al, 2013	0.56	0.39	30	0.58	0.6	30	36.2%	-0.04 [-0.55, 0.47]				
Samaan et al, 2016	0.72	0.21	15	0.81	0.27	34	24.8%	-0.35 [-0.96, 0.26]				
Subtotal (95% CI)			60			78	78.3%	-0.20 [-0.54, 0.15]	•			
Heterogeneity: Tau² = (0.00; Ch	$i^2 = 0.8$	69, df=	2 (P = 0)	l.71); P	= 0%						
Test for overall effect: 2	Z = 1.11	(P = 0.	27)									
Total (95% CI)			77			99	100.0%	-0.25 [-0.55, 0.06]	•			
Heterogeneity: Tau² = (0.00; Ch	i² = 1.8	88, df=	4 (P = 0)	i.80); P	= 0%		-	-2 -1 1 2			
Test for overall effect: Z	Z = 1.60	(P = 0.	11)						Less in FAIS Less in Controls			
Test for subgroup diffe	rences:	Chi²=	0.42, 0	lf=1 (P	= 0.52	$(2), 1^2 = 0$	1%		Lead III 740 Lead III Collido			

1.15 Peak Hip Adduction Torque in Stance

•		FAIS			ontrol			Std. Mean Difference	Std. Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI		
1.15.1 Cam Only											
Brisson et al, 2013 Subtotal (95% CI)	0.68	0.11	10 10	0.79	0.16	13 13	19.2% 19.2%	-0.75 [-1.61, 0.11] - 0.75 [-1.61, 0.11]			
Heterogeneity: Not ap	plicable										
Test for overall effect:	Z = 1.72	(P = 0)	.09)								
1.15.2 Mixed											
Diamond et al, 2016	8.6	1.7	15	8.5	2.2	14	26.6%	0.05 [-0.68, 0.78]			
Hunt et al, 2013	0.75	0.13	30	0.8	0.14	30	54.2%	-0.37 [-0.88, 0.15]			
Subtotal (95% CI)			45			44	80.8%	-0.23 [-0.65, 0.19]	•		
Heterogeneity: Tau ² =	0.00; Ch	$i^2 = 0.8$	34, df=	1 (P = 0)).36); P	= 0%					
Test for overall effect:	Z = 1.07	(P = 0)	.28)								
Total (95% CI)			55			57	100.0%	-0.33 [-0.71, 0.05]	•		
Heterogeneity: Tau ² =	0.00; Ch	$j^2 = 2.0$	00, df=	2(P = 0)).37); P	= 0%		-			
Test for overall effect:				•					Less in FAIS Less in Controls		
Test for subgroup diffe	erences:	Chi²=	1.16. 0	f=1(P	= 0.28	3), $I^2 = 1$	3.8%		Less III FAIG Less III Controls		

1.16 Peak Hip Abduction Torque in Stance

_		FAIS			ontrol			Std. Mean Difference	Std. Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI		
1.16.1 Cam Only											
Brisson et al, 2013	0.2	0.05	10	0.23	0.08	13	17.6%	-0.42 [-1.26, 0.41]			
Kumar et al, 2014	0.89	0.23	7	0.84	0.12	8	11.8%	0.26 [-0.76, 1.28]	 •		
Subtotal (95% CI)			17			21	29.4%	-0.14 [-0.80, 0.51]			
Heterogeneity: Tau ² =	0.01; Ch	ii ² = 1.0	03, df=	1 (P = 0)).31); F	= 3%					
Test for overall effect:	Z = 0.43	(P = 0)	.67)								
1.16.2 Mixed											
Diamond et al, 2016	6	2.6	15	5.2	2.2	14	22.8%	0.32 [-0.41, 1.06]	- •		
Hunt et al, 2013	0.07	0.07	30	0.08	0.07	30	47.8%	-0.14 [-0.65, 0.37]			
Subtotal (95% CI)			45			44	70.6%	0.01 [-0.41, 0.44]	•		
Heterogeneity: Tau² =	0.00; Ch	ii ² = 1.1	04, df=	1 (P = 0)).31); F	= 3%					
Test for overall effect:	Z = 0.05	(P = 0)	.96)								
Total (95% CI)			62			65	100.0%	-0.04 [-0.39, 0.31]	•		
Heterogeneity: Tau² =	0.00; Ch	i ² = 2.3	22, df=	3(P = 0)).53); F	²= 0%					
Test for overall effect:	Z = 0.21	(P = 0.	.84)			Less in FAIS Less in Controls					
Test for subgroup diffe	erences:	Chi²=	0.15, 0	f=1 (P	= 0.70	$(1)^{-1} = 0$	1%		Less III FAIG Less III Collitois		

1.17 Peak Hip Internal Rotation Torque in Stance

1		FAIS		C	ontrol		9	Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
1.17.1 Cam Only									
Brisson et al, 2013 Subtotal (95% CI)	0.11	0.04	10 10	0.12	0.03	13 13	20.3% 20.3%	-0.28 [-1.11, 0.55] - 0.28 [-1.11, 0.55]	-
Heterogeneity: Not app	olicable								
Test for overall effect: 2	Z = 0.66	(P = 0.	51)						
1.17.2 Mixed Diamond et al, 2016 Hunt et al, 2013 Subtotal (95% CI) Heterogeneity: Tau ² = Test for overall effect: 2		i²= 0.6			0.3 0.06 I.43); l ^a	14 30 44 = 0%	26.3% 53.5% 79.7%	0.00 [-0.73, 0.73] -0.36 [-0.87, 0.15] -0.24 [-0.66, 0.18]	•
Total (95% CI) Heterogeneity: Tau² = Test for overall effect: <i>I</i> Test for subgroup diffe	Z = 1.30	(P = 0.	19)	•			100.0% %	-0.25 [-0.62, 0.13] -	-2 -1 0 1 2 Less in FAIS Less in Controls

1.18 Peak Hip External Rotation Torque in Stance

· · · · · · · · · · · · · · · · · · ·						1			
		FAIS		C	ontrol		9	Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
1.18.1 Cam Only									
Brisson et al, 2013	0.14	0.03	10	0.19	0.07	13	17.4%	-0.85 [-1.72, 0.01]	
Kumar et al, 2014	0.12	0.12	7	0.18	0.07	8	12.0%	-0.59 [-1.63, 0.46]	
Subtotal (95% CI)			17			21	29.4%	-0.74 [-1.41, -0.08]	-
Heterogeneity: Tau ² =	0.00; Ch	$i^2 = 0.1$	15, df=	1 (P = 0)).70); P	= 0%			
Test for overall effect: 2	Z = 2.19	(P = 0.	.03)						
1.18.2 Mixed									
							04.00	0.407.4.7.0043	_
Diamond et al, 2016	1.2		15	1.4	0.5	14	24.0%	-0.43 [-1.17, 0.31]	
Hunt et al, 2013	0.12	0.04	30	0.15	0.03	30	46.7%	-0.84 [-1.37, -0.31]	
Subtotal (95% CI)			45			44	70.6%	-0.70 [-1.13, -0.27]	•
Heterogeneity: Tau² =	0.00; Ch	$i^2 = 0.7$	77, df=	1 (P = 0)),38); P	² =0%			
Test for overall effect: 2	Z= 3.19	(P = 0.	.001)						
Total (95% CI)			62			65	100.0%	-0.71 [-1.07, -0.35]	•
Heterogeneity: Tau ² =	0.00; Ch	$j^2 = 0.9$	33, df=	3(P = 0)).82); P	²= 0%		_	
Test for overall effect: 2				•	- ''				-2 -1 U 1 2
Toot for eubaroup diffe		•		f = 1 /P	- n a1) I2 = 0	196		Less in FAIS Less in Controls