Supplementary material

Table S1: Statements generated during the concept mapping brainstorming process included in the final seven themes validated by the participants, the median (range) importance of screening and screening feasibility ratings, and the Go-Zone quadrant for each statement.

			Rating (1-4)* Median (range)		
Theme	**#**	**Statement**	**Importance of screening**	**Screening feasibility**	**Go-Zone†**
1. The player's physical and motor skill profile n= 13	1	That a player lacks muscle strength in the external rotators of the hip	3 (1 – 4)	3 (1 – 4)	1
	2	That a player lacks muscle strength at the back of the thigh	3 (1 – 4)	2 (1 – 4)	3
	3	That a player has not developed an automized movement pattern that reduces 'uneven' loads.	3 (1 – 4)	1 (1 – 4)	3
	4	That a player has not developed neuromuscular control of the movement patterns which would protect against undue strain, also in unforeseen circumstance	3 (1 – 4)	1 (1 – 3)	3
	33	Leg length discrepancy§§	2 (1 – 3)	2 (1 – 4)	4
	41	Insufficient strength	3 (2 – 4)	3 (1 – 4)	1
	46	Reduced dynamic knee-joint control	3 (2 – 4)	1 (1 – 4)	3
	58	Physiology (strength, joint mobility, anatomic variations which challenge the stability of the knee)§	3 (2 – 4)	2 (1 – 4)	3
	64	Asymmetry in stability	3 (1 – 4)	3 (1 – 4)	1
	72	Asymmetry in strength	3 (2 – 4)	3 (1 – 4)	1
	82	Instability	3 (2 – 4)	2 (1 – 4)	3
	95	Weak ligaments, menisci & cruciate ligament§	3 (2 – 4)	2 (1 – 4)	3
	96	Insufficient muscle strength around the knee	3 (2 – 4)	2 (1 – 4)	3
2. Preparation and training n=27	8	Too much high-intensity training and competition at an early age	2 (1 – 4)	2 (1 – 4)	4
	10	Insufficient all-round training	3 (1 – 4)	3 (1 – 4)	1
	12	Coaches (especially of youth) inadequately trained to structure all the necessary training for a player.	3 (1 – 4)	2 (1 – 4)	3
	15	Inadequate injury prevention training	4 (2 – 4)	3 (1 – 4)	1
	16	Insufficient warming up**	3 (2 – 4)	3 (2 – 4)	1
	19	Focus on injury-prevention initiatives, physical training and warming up	4 (2 – 4)	3 (2 – 4)	1
	20	Insufficient injury-prevention exercises	4 (1 – 4)	3 (2 – 4)	1
	28	Too much training and starting again too soon after a minor injury or sickness	4 (2 – 4)	3 (1 – 4)	1
	29	Too much training/competition (insufficient restitution)	3 (2 – 4)	3 (1 – 4)	1
	30	Correct timing of nutritional intake	2 (1 – 4)	2 (1 – 4)	4
	31	Young players playing too often and too hard, as they advance	3 (1 – 4)	2 (1 – 4)	3
	32	Poor injury-prevention training can be the cause.	4 (2 – 4)	3 (1 – 4)	1
	38	Inadequate knowledge about how to prepare, for example pre-season, to withstand the pressure that one's legs will be exposed to	3 (1 – 4)	1 (1 – 3)	3
	45	Mode of training	3 (2 – 4)	3 (2 – 4)	1
	48	Insufficient focus on specific injury-prevention training	4 (2 – 4)	3 (1 – 4)	1
	50	Inadequate warm up of joints and muscles**	3 (1 – 4)	3 (1 – 4)	1
	55	Both lack of injury-prevention training, at the same time as football training and incorrect injury-prevention training can be a problem.	4 (2 – 4)	3 (2 – 4)	1
	63	Insufficient mental preparation	3 (2 – 4)	1 (1 – 3)	3

Tabel S1 continued

	66	Using painkillers while playing	3 (1 – 4)	3 (1 – 4)	1
	69	Training- and competition load	3 (2 – 4)	3 (1 – 4)	1
	71	Deprioritization of injury-prevention training	4 (1 – 4)	3 (1 – 4)	1
	76	The degree of preventive training	4 (2 – 4)	3 (1 – 4)	1
	78	In addition, we see a rise in training/competition load without a corresponding rise in the focus on injury-prevention training.	4 (2 – 4)	3 (1 – 4)	1
	84	The load[##]	3 (2 – 4)	3 (1 – 4)	2
	85	Frequency of training and match	3 (1 – 4)	3 (2 – 4)	1
	86	Injured player returning to competition too early	4 (2 – 4)	3 (1 – 4)	1
	87	Primary injury-prevention training is, unfortunately, not a consistent part of training programs in both handball and soccer. Research suggests that targeted, injury-prevention training in high-intense, pivoting contact-sports, such as handball and football, can reduce traumatic knee injuries by about 50 %	4 (2 – 4)	3 (2 – 4)	1
3. Foot wear and playing surface n=18	5	My experience with teammates has been accidents due to slippery surfaces	2 (1 – 4)	3 (1 – 4)	2
	6	Because one did not have the correct studs on one's football boots.	3 (1 – 4)	4 (1 – 4)	1
	18	Focus on the correct footwear that match the surface in the sports hall or grass/artificial turf	3 (1 – 4)	3 (2 – 4)	1
	21	Surface	3 (1 – 4)	3 (1 – 4)	1
	24	Footwear	3 (1 – 4)	4 (2 – 4)	1
	26	Correct boots	2 (1 – 4)	4 (2 – 4)	2
	35	Wrong footwear for the surface	3 (1 – 4)	3 (2 – 4)	1
	36	Surface conditions	3 (2 – 4)	3 (2 – 4)	1
	37	Wrong boots	3 (1 – 4)	3 (2 – 4)	1
	39	Boots	3 (1 – 4)	3 (1 – 4)	1
	49	Use the correct footwear	3 (1 – 4)	3 (1 – 4)	1
	51	Which type of studs one has on the boots, depending on the surface	2 (1 – 4)	3 (2 – 4)	2
	52	Hardness of the artificial turf stresses the body and knees more than normal grass, especially the older types.	2 (1 – 4)	3 (1 – 4)	2
	53	When one plays on artificial turf, the feet grip more on the grass, so sometimes the players twist their knees/ankles because the foot becomes stuck.	3 (2 – 4)	3 (1 – 4)	1
	56	In football, the surface conditions can be relevant when, for example, in the heat of the moment, one cannot take holes in the surface of the field into account, and that, combined with the contact-part. The body does not have time to react.	3 (2 – 4)	3 (1 – 4)	1
	60	The floor	3 (1 – 4)	4 (1 – 4)	1
	67	Training conditions (e.g., the surface they play on)	3 (2 – 4)	3 (1 – 4)	1
	91	A knee injury can occur when the foot gets stuck, with abrupt stops, on artificial turf.	3 (2 – 4)	3 (1 – 4)	1
4. The sport's impact on risk of injury n=14	7	One sees many footballers getting involved in solo accidents and that negatively affects the knee.	2 (1 – 4)	2 (1 – 4)	4
	9	Specialising in primary sport too early[#]	2 (1 – 4)	2 (1 – 4)	4
	22	Unforeseen tackling	3 (2 – 4)	1 (1 – 4)	3
	43	Type of sports	2 (1 – 4)	4 (1 – 4)	2
	54	The contact part, in football, especially when being tackled by the opponent, either when one tries to avoid collision or just as collision occurs.	3 (2 – 4)	1 (1 – 4)	3
	61	Insufficient player-experience[#]	2 (1 – 4)	3 (1 – 4)	2

Tabel S1 continued

	70	Contact sport	3 (2 – 4)	4 (1 – 4)	1
	74	Type of sport	3 (1 – 4)	4 (1 – 4)	1
	80	Contact sport is not a controlled environment in the way a fun-run is. Here there is a risk that one is forced to try to avoid players or collision with the opponent, which can result in a sudden twist or blow.	3 (2 – 4)	2 (1 – 4)	3
	92	A knee injury can occur if you come into a tackle wrongly and you experience a twist in the knee. Can result in a meniscus or cruciate ligament injury. Or aggravated ligament injury.	3 (1 – 4)	1 (1 – 4)	3
	93	A knee injury can occur if you land wrongly and twist a knee in an aerial tackle.	3 (1 – 4)	1.5 (1 – 4)	3
	97	Experience some leg positions that the player is not prepared for!!	3 (1 – 4)	1 (1 – 4)	3
	98	Push, shove	2 (2 – 4)	2 (1 – 4)	4
	100	Enter a tackle where the body is not obliging or tackling that twists the knee, even though the body is obliging.	3 (1 – 4)	1 (1 – 4)	3
5. Mental and physical fatigue n=12	11	Too many competitions over too short a period (both in youth and senior)	3 (2 – 4)	3 (2 – 4)	1
	13	Lack of proper restitution (especially sleep)[§]	3 (2 – 4)	2 (1 – 4)	3
	14	Too much overload over a short period	3 (2 – 4)	2 (1 – 4)	3
	17	Overload	3 (2 – 4)	2 (1 – 4)	3
	23	Mental and physical tiredness	4 (2 – 4)	2 (1 – 3)	3
	27	Overtraining/tired	3 (2 – 4)	2 (1 – 3)	3
	47	Imbalance restitution/exposure	3 (2 – 4)	2 (1 – 4)	3
	57	Tiredness in the body and brain so the body does not have time to react.	3 (2 – 4)	1 (1 – 4)	3
	79	When one is focused on winning the game, one can deprioritize one's safety and end in some dangerous situations.	2 (1 – 4)	2 (1 – 3)	4
	81	Reoccurring overload over time can contribute towards provoking acute injury[§]	3 (2 – 4)	2 (1 – 4)	3
	94	Tiredness	3 (2 – 4)	2 (1 – 4)	3
	99	Tiredness in the muscles around the knee!! Same outcome as inadequate muscle strength[§]	3 (2 – 4)	2 (1 – 4)	3
6. History of injury n=5	34	Injury history	3 (2 – 4)	4 (2 – 4)	1
	44	Earlier injuries	4 (2 – 4)	3 (2 – 4)	1
	59	Earlier history of minor injuries	3 (2 – 4)	3 (1 – 4)	1
	65	Minor injuries, which can lead to larger injuries	3 (2 – 4)	2 (1 – 4)	3
	83	Earlier injuries in the player (not just knee)	3 (2 – 4)	3 (2 – 4)	1
7. Genetics and context n=9	25	Sex	2 (1 – 4)	4 (1 – 4)	2
	42	Age	2 (1 – 4)	4 (1 – 4)	2
	62	Biology	3 (1 – 3)	2 (1 – 4)	3
	68	Genetics	3 (1 – 4)	1 (1 – 4)	3
	75	Anatomy	3 (2 – 3)	2 (1 – 4)	3
	77	Physiological differences (sex, hypermobility etc.) which increase the risk of knee injuries.	3 (2 – 4)	2 (1 – 4)	3
	88	Research from the world's largest twin-registry, in Sweden, shows that an inheritance-component can constitute up to 69 % of causes for ACL rupture. This, probably, also explains the high rate of reinjuries, that possibly are more dependent on the genetic disposition for the injury than they are on insufficient rehabilitation or returning to the sport too early.	2 (1 – 4)	1 (1 – 4)	4
	89	The social context that can partially explain the relative high rate of injuries in females[##]	2 (1 – 3)	1 (1 – 2)	4

Tabel S1 continued

	90	The societal female ideal (precious, non-muscular) creates a culture where one can be even more likely to deprioritize strength training as primary or secondary prevention (both collectively and on an individual basis) within women's sport, because this form of training is not in line with the society's female ideal.	2 (1 – 4)	1.5 (1 – 4)	4

* Rating scores for importance of screening/screening feasibility: 1 (not important/not easy) to 4 (very important/very easy).
† Go-Zone quadrants: 1, top right; 2, bottom right; 3, top left; 4, bottom left. See also Figure 2.

** Moved from theme 1
# Moved from theme 2
Moved from theme 6
§ Moved from theme 7
§§ Moved from theme 8