SEBT Norms: Star Excursion Balance Test

Reference values by sport and direction, scoring and cut-off scores

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1. Measuring and Scoring

Leg length. Measure in centimetres from the bony point at the front of the hip (ASIS) to the inside ankle bone.

Reaches. Write down how the test was run: barefoot or in shoes, hands on hips or free, the number of practice reaches, and the mean or the best of 3. The studies below differ on each of these.

%LL = reach (cm) ÷ leg length (cm) × 100[13]

Composite (%) = (anterior + posteromedial + posterolateral) ÷ (3 × leg length) × 100[14]

Difference (cm) = right reach minus left reach, for each direction

All norms below are group means as a percentage of leg length (%LL), from the floor test. Compare an athlete with the group most like them, tested the same way.

2. University Athletes: Range of Team Averages (%LL)

Group	n	Anterior	Posteromedial	Posterolateral	Composite
US university athletes, 8 sports	393	62 to 69	99 to 113	84 to 97	82 to 92

Lowest to highest team average across the 8 sports.[1] In anterior reach, the only difference between the sexes was in soccer, where men reached less than women.[1]

3. SEBT Norms for the 3 Direction Test (%LL)

Group	n	Anterior	Posteromedial	Posterolateral	Composite
Elite under 18 female handball players	188	65.2	110.0	107.1	94.1
Elite adult athletes (Romania), right leg	122	81.59	97.33	104.66	94.53
Elite adult athletes (Romania), left leg	122	80.12	99.13	106.64	95.3
Male high school soccer players (Japan)	11	73.3	106.6	105.4	95.1
University students (Japan)	35	77.2	95.7	102.8	
Under 20 male professional club soccer players (Brazil)	26	61.3	97.9	99.1	85.5

Handball: aged 16.8, barefoot, hands on hips, tip of the big toe at the centre, 4 practice reaches then the mean of 3, legs pooled.[2] Elite adults: first and second division soccer, basketball and volleyball players aged 18 to 35, men and women together, hands on hips, third of 3 recorded reaches.[3] Japanese soccer: barefoot, kicking leg, 6 practice reaches then the best of 3, baseline before a no exercise session.[4] Japanese students: 23 men and 12 women, heel kept down, mean of the last 3 of 9 reaches, legs averaged, no composite reported.[5] Brazilian soccer: barefoot, hands on hips, big toe at the centre, 4 practice reaches then the mean of 3, kicking leg.[6]

The anterior averages spread from about 61% to 82%, far more than the two back directions. Compare anterior reach only with figures from the same protocol.

4. SEBT Norms for All 8 Directions (%LL)

Direction	Active adults (US), in shoes	Field hockey players (India)	Football players (India)
1 Anterior	86.1	84.97	87.02
2 Anterolateral	78.2	77.55	78.54
3 Lateral	78.4	94.09	89.38
4 Posterolateral	93.4	103.64	101.58
5 Posterior	105.5	110.77	107.51
6 Posteromedial	104.3	108.07	106.21
7 Medial	97.6	100.82	103.56
8 Anteromedial	91.5	93.99	94.99

US: 36 physically active adults (18 men, 18 women) aged 23.6, in their own athletic shoes, ball of the foot at the centre, standing on the dominant leg, 6 practice reaches then the mean of 3.[7] India: 15 field hockey and 15 football university players aged 18 to 25, barefoot, hands on hips, stance heel kept down, 4 practice reaches then the mean of 3, both legs averaged.[8]

5. Why SEBT Norms Differ Between Studies

- **Best or average.** Taking the best reach gives significantly higher results than averaging 3 reaches. A systematic review recommends the average of 3, because it is more reliable.[10]
- **Hands on hips or free.** Letting the arms move gives significantly higher scores.[10] Most studies on this page kept the hands on the hips.
- **Practice reaches.** Reliable results need 4 to 6 practice reaches in each direction, though athletes who know the test may need fewer.[10]
- **Shoes, warm-up and set-up.** The same review found the effects of footwear, warm-up and a dedicated kit unclear.[10] Record what you used so the next test matches.
- **Foot position.** The handball study put the tip of the big toe at the centre and the US study the ball of the foot.[2,7] Where the foot sits moves the starting point of every reach, so keep it the same each time.
- **Floor or kit.** In 20 active men, anterior reach was further on the floor test than on the Y Balance Test kit, while posteromedial and posterolateral reach did not differ.[12] Compare kit results with Y Balance Test norms.

6. SEBT Cut-off Scores and Real Change

- **Anterior difference over 4 cm:** 2.5 times the rate of lower extremity injury in 235 high school basketball players.[11]
- **Composite below 94% of leg length:** 6.5 times the rate, in the girls in the same study.[11]
- **One study, one sport.** A study of 393 university athletes concluded that SEBT results and injury risk should be read in the context of the athlete's sport.[1] Use the figures to start a conversation with the athlete and coach, not as a pass or fail line.
- **Real change:** in 122 elite athletes tested within one session, the smallest detectable change was 2.54 to 4.61 points for anterior reach, 7.02 to 7.94 points for the two back directions and 4.64 to 4.78 points for the composite.[3] A smaller change may be measurement noise.

7. Thai and Asian Athletes

We found no published SEBT reference values for Thai athletes. The closest Asian figures are the Japanese and Indian groups in the tables.[4,5,8] For a Thai squad, the most useful norms are your own: test the whole squad at the start of the season on the same set-up, record each athlete's scores, and compare each later test with that baseline.

8. Your Squad's Own Norms (%LL)

Date	Squad or group	n	Anterior	Posteromedial	Posterolateral	Composite

Write in your squad's average at each testing session, and note the protocol you used: footwear, hand position, practice reaches, and mean or best.

Sources

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