Bests of athletic performance Lecture 3

POTEcho

PTE742

http://potecho.pte.hu

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Requirements, recommended literature

Result of the test (%)	Grade
100-85	5
84-75	4
74-65	3
64-50	2
0-49	1

- 25 % absence is allowed

- Examination: written test (simple choice, true false questions)

  Lessons:

  - 09/10/2024; 16/10/2024; 30/10/2024; 06/11/2024

  Room: SIOT1015

  Presentations: homepage of Sports Medicine Center (Educational materials)

- Recommended literature:

  1. Cooper C.B, Storer T.W. Exercise testing and interpretation. A practical approach. Cambrige University Press, Cambrige, 2004

  2. Katch V.L., McArdle W.D., Katch F.I. Essentials of exercise physiology. Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia, USA, 2011

The most extreme body compositions in sport

Physical performance - Classification of physical abilities

Conditional physical abilities:

1. Endurance

2. Force

3. Speed

Flexibility

Coordinational physical abilities:

1. Ability to differentiate (coordination)

2. Coupling or synchronization capacity

3. Rhythm ability or rhythm

4. Balancing ability

5. Readaptation or change capacity
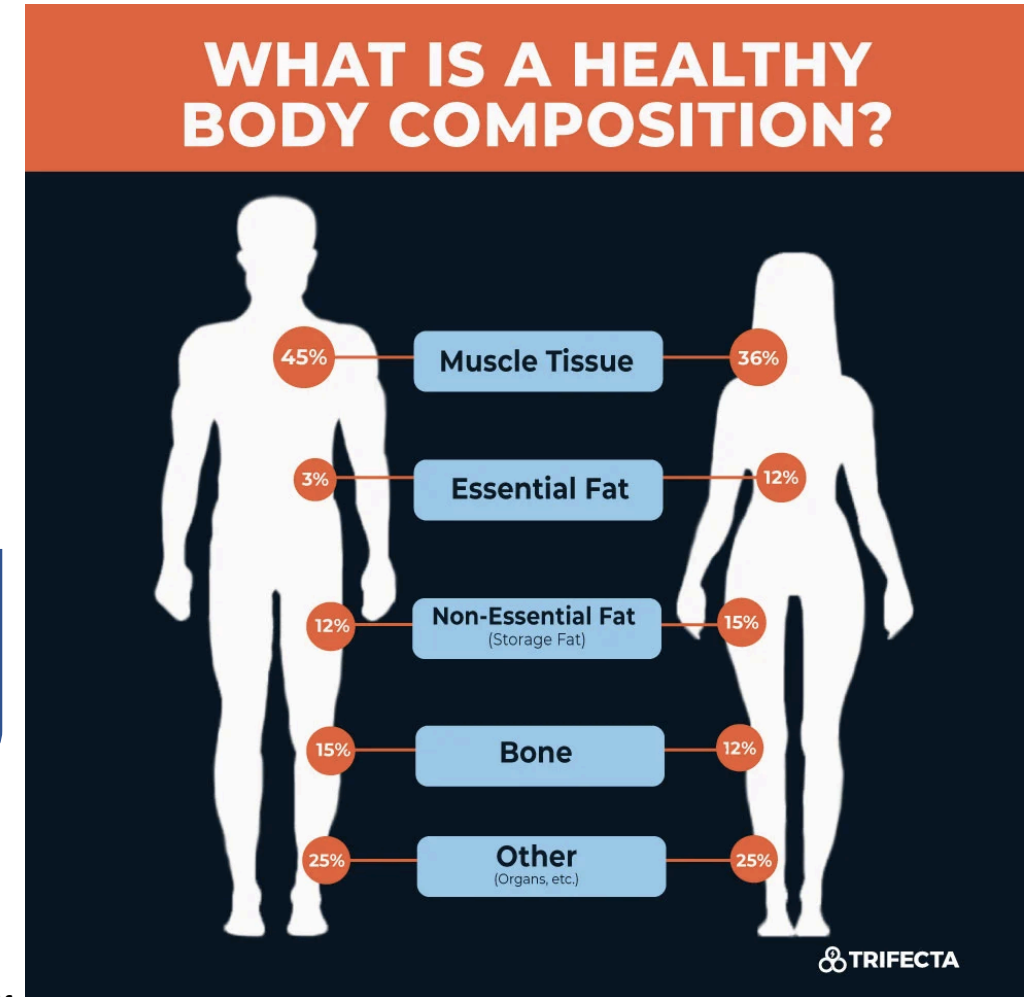
6. Guidance capacity

7. Reaction capacity

Body composition

Special abilities

References: http://tamop-sport.ttk.pte.hu/files/tananyagfejlesztes/motorikus-kepessegek-merese.pdf
https://www.lifepersona.com/what-are-conditional-physical-capabilities-classification
https://www.lifepersona.com/what-are-coordinating-physical-capabilities

Body composition, sport specific anthropometry

Sportanthropometry: investigate the relationship between sports performance and body composition, and characterize the somatotype of athletes at different ages.

Body composition: it describes the percentages of fat, bone and muscle in human bodies

WHAT IS A HEALTHY BODY COMPOSITION?

	Muscle Tissue	
45%		36%
	Essential Fat	
3%		12%
	Non-Essential Fat (Storage Fat)	
12%		15%
	Bone	
15%		12%
	Other (Organs, etc.)	
25%		25%

TRIFECTA

Refernces: http://tamop-sport.ttk.pte.hu/files/tananyagfejlesztes/motorikus-kepessegek-merese.pdf
Mészáros J, Mohácsi J, Szabó T, Szmodis I (2000) Acta Biologica Szegediensis 44(1-4):189-192.
https://www.trifectanutrition.com/blog/what-is-body-composition-and-how-to-measure-it

Body composition measurements

Ideal body fat percentage for women

Essential fat 10-13% | Athletes 14-20% | Fitness 21-24% | Acceptable 25-31% | Obesity >32%

-   Non-laboratory measurements
 E.g. Body fat percent estimation with Lange caliper

https://www.youtube.com/watch?v=msMg9rkM4DU

-   Laboratory measurements
E.g. Body fat percent estimation with bioimpedance analisys

https://www.youtube.com/watch?v=c3SDVlhe8HQ

Ideal body fat percentage for men

Essential fat 2-5% | Athletes 6-13% | Fitness 14-17% | Acceptable 18-24% | Obesity >25%

References: http://tamop-sport.ttk.pte.hu/files/tananyagfejlesztes/motorikus-kepessegek-merese.pdf
https://www.fastyle.me/blog/why-people-of-the-same-weight-have-different-body-shapes/
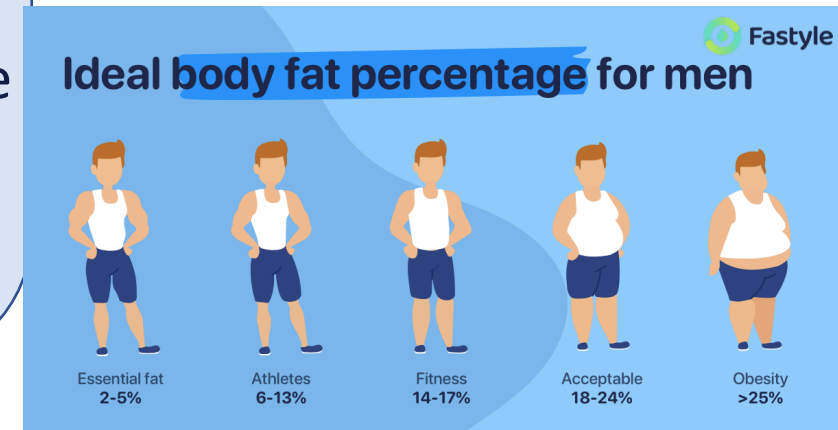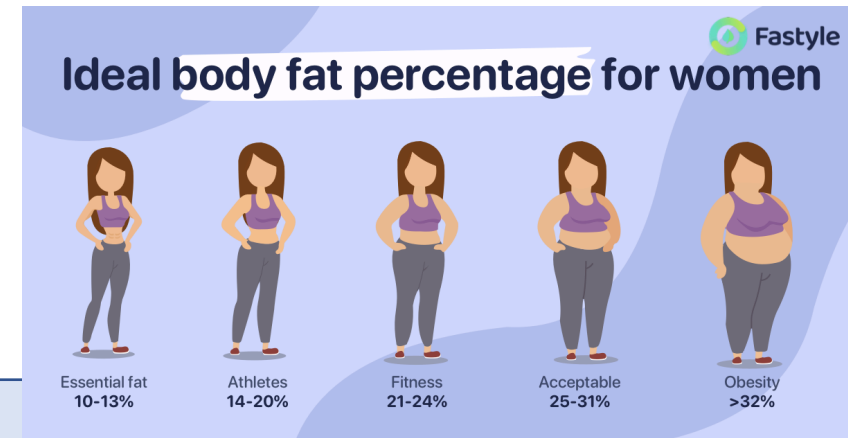
Different somatotypes in sport

https://www.youtube.com/watch?v=lB6vQOtkEkU

Athletes with extreme body composition I.

Table 16.1 Percentage Body Fat of Male and Female Athletes

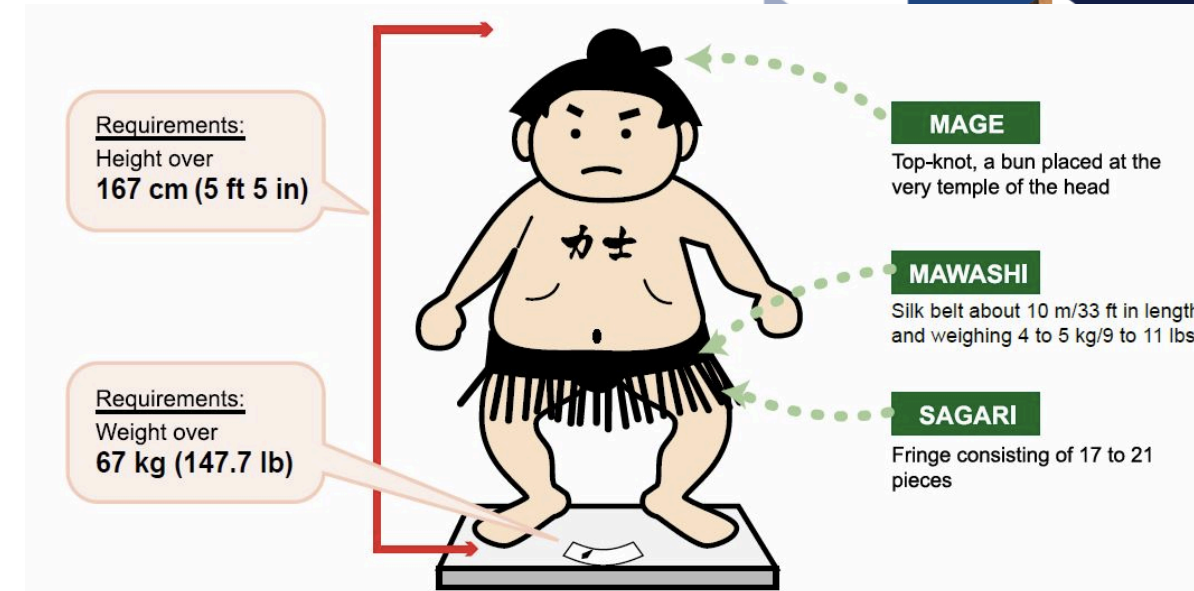| SPORT	PERCENTAGE BODY FAT	
	MALE	FEMALE
Ballet dancing	8–14	13–20
Baseball/softball	12–15	12–18
Basketball	6–12	20–27
Body building	5–8	10–15
Canoe/Kayak	6–12	10–16
Cycling	5–15	15–20
Football		
Backs	9–12	
Linebackers	13–14	
Lineman	15–19	
Quarterbacks	12–14	
Gymnastics	5–12	10–16
Horse racing	8–12	10–16
Ice/Field hockey	8–15	12–18
Orienteering	5–12	12–24
Racquetball	8–13	15–22
Rock climbing	5–10	13–18
Rowing	6–14	12–18
Rugby		10–17
Skiing		
Alpine	7–14	18–24
Cross-country	7–12	16–22
Jumping	10–15	12–18
Speed skating	10–14	15–24
Synchronized swimming		12–24
Swimming	9–12	14–24
Tennis	12–16	16–24
Track and fiel		
Discus throwers	14–18	22–27
Jumpers	7–12	10–18
Long distance	6–13	12–20
Shot putters	16–20	20–28
Sprinters	8–10	12–20
Decathletes	8–10	
Triathlon	5–12	10–15
Volleyball	11–14	16–25
Weightlifters	9–16	
Wrestling	5–16	

Data compiled from the research literature.

Reference: Katch V.L., McArdle W.D., Katch F.I. Essentials of exercise physiology. Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia, USA, 2011

Athletes with extreme body composition II.

Hakuho: one of the most successful sumo athletes.
(Height: 192 cm, Weight: 158 kg)
Professional Sumo wrestlers: **weight** between 77.0 and 150.0 kg, **BMI** between 25.9 and 44.5 kg/m^2, **body fat %** between 11.9 and 37.0%, **lean body mass** between 59.1 and 107.6 kg.

Requirements:
Height over
167 cm (5 ft 5 in)

Requirements:
Weight over
67 kg (147.7 lb)

MAGE
Top-knot, a bun placed at the very temple of the head

MAWASHI
Silk belt about 10 m/33 ft in length and weighing 4 to 5 kg/9 to 11 lbs

SAGARI
Fringe consisting of 17 to 21 pieces

Most career championships [edit]

Official championships since 1909[+]

	Name	Total	Years
1	Hakuhō	45	2006–2021
2	Taihō	32	1960–1971
3	Chiyonofuji	31	1981–1990
4	Asashōryū	25	2002–2010
5	Kitanoumi	24	1974–1984
6	Takanohana II	22	1992–2001

Most undefeated championships

[edit]

Zenshō-yūshō since 1949[+]

	Name	Total	Years
1	Hakuhō	16	2007–2021
2	Futabayama	8	1936–1943
	Taihō	8	1963–1969
	Tachiyama	7	1910–1915
4	Kitanoumi	7	1977–1984

Most consecutive championships

[edit]

Consecutive championships

	Name	Total	Years
	Hakuhō	7[+]	2010–2011
	Asashōryū	7[†]	2004–2005
	Hakuhō	6	2014-2015
3	Taihō	6	1966–1967
	Taihō	6	1962-1963

Most championship playoffs [edit]

Most playoffs

	Name	Total	Won	Lost
1	Hakuhō	10	6	4
	Takanohana II	10	5	5
3	Kitanoumi	8	3	5
4	Akebono	7	4	3
	Musashimaru	7	1	6
	Chiyonofuji	6	6	0

Refences: Katch V.L., McArdle W.D., Katch F.I. Essentials of exercise physiology. Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia, USA, 2011
https://en.wikipedia.org/wiki/List_of_sumo_record_holders
Kanehisa, H., Kondo, M., Ikegawa, S., & Fukunaga, T. (1998). European journal of applied physiology and occupational physiology, 77(4), 352–359.

The most skillful, the most accurate athletes

Skillfulness, accuracy

Skillful: Having the ability to perform well: able, capable, competent, good, skilled under high pressure and under competitive conditions.

Accuracy: the ability to control movement in a given direction or at a given intensity.

Skillfulness and technique of Ronaldo (27:25)
https://www.youtube.com/watch?v=4achmhzLNoY

Refernces: http://tamop-sport.ttk.pte.hu/files/tananyagfejlesztes/motorikus-kepessegek-merese.pdf.
https://sportresilience.com/accuracy/

Measuring skillfulness and accuracy

- Field tests E.g. Pin Point Accuracy (in Tennis)

https://www.youtube.com/watch?v=o0PQoiBRXJQ

- Laboratory measurement E.g. Accuracy of the throwing (American football)

https://www.youtube.com/watch?v=tVoqA-LKGb4
(1:45)

Reference: http://tamop-sport.ttk.pte.hu/files/tananyagfejlesztes/motorikus-kepessegek-merese.pdf

Sports, where is vary important the <u>skillfulness</u> and the <u>accuracy</u>

1. Golf
2. Boxing
3. Ice hockey
4. Mixed martial arts
5. Tennis
6. Gymnastics
7. Hurling
8. Soccer
9. Water polo
10. Rugby

1. Billiards
2. Golf
3. Archery
4. Rifle, pistol, and shotgun shooting

References: http://tamop-sport.ttk.pte.hu/files/tananyagfejlesztes/motorikus-kepessegek-merese.pdf
https://www.pledgesports.org/2018/03/what-are-the-most-skilful-sports/
https://www.lasikmd.com/blog/a-fine-line-four-sports-that-demand-precision

18

The most skillful, the most accurate athletes

https://www.youtube.com/watch?v=VItAgg2H-HE

What skills are necessary for someone to be the most accurate and skillful athletes?

Accuracy:
- Hand-eye coordination
- Vision
- Balancing ability
- Strength, endurance
- Mental preparation

Skillfulness:
- Sport technical knowledge, practice
- Adequate level of motoric skills
- Creativity

Reference: https://www.istockphoto.com/hu/fot%C3%B3k/archery-sport, Richard, V., Abdulla, A. M., & Runco, M. A. (2017). Journal of Genius and Eminence, 2(1), 65-76.

The most extreme mental performances

Mental performance, mental toughness (MT)

Athlete has ''a high sense of self-belief and an unshakable faith that they control their own destiny, these individuals can remain relatively unaffected by competition and adversity" .

https://www.youtube.com/watch?v=9B5pFK-X_tg

Components of MT:
(labelled the 4Cs)
-**control** (emotional and life),
-**commitment** (tendency to involve oneself),
-**challenge** (belief that life is changeable and to view this as an opportunity)
- **confidence** (interpersonal and in abilities)

References: Jones G, Connaughton H.D., Connaughton D. (2002) Journal of Applied Sport Psychology 14(3):205-218
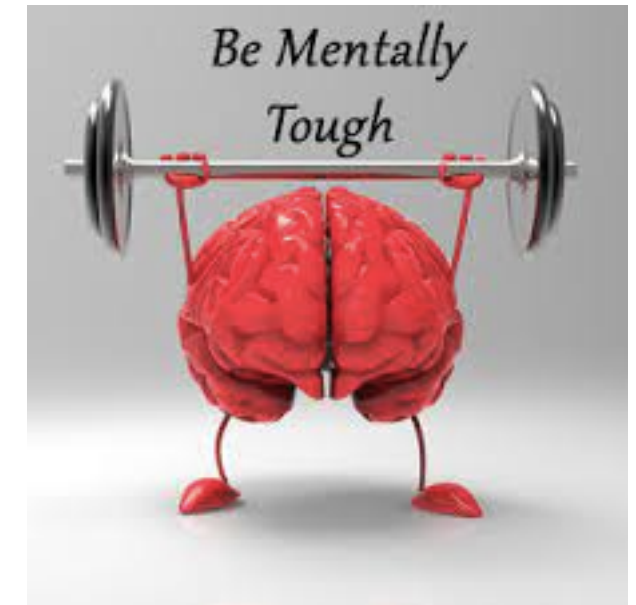https://www.donovanmentalperformance.com/5-tips-to-mental-toughness-in-sports
Nicholls AR, Polman RCJ, Levy AR, Backhoused SH (2009) Personality and Individual Differences 47(1): 73-75.

Measuring the mental toughness

-   Questionnaire survey: Mental Toughness
    Questionnaire 48-items (MTQ48)

https://www.youtube.com/watch?v=8hQCwU7ReFU

References: Perry, J. L., Strycharczyk, D., Dagnall, N., Denovan, A., Papageorgiou, K. A., & Clough, P. J. (2021). Frontiers in psychology, 12, 654836.
https://doi.org/10.3389/fpsyg.2021.654836http://www.dralexdiazconsulting.com/general/sports-mental-toughness/

Athletes with extrem mental performance
How do the real athletes think?

Asha Philip (sprinter, gymnast)
2007: 100 m sprint, winning gold at the 2007 World Youth Championships aged 16
Following a serious knee injury in gymnastics, and a rehabilitation period of several years, she returned to athletics.
2014: winning gold at the European Athletics Championships in the 4 x 100 m relay
2017: she won gold at the 2017 European Athletics Indoor Championships 60 m for women, and bronze in the 4 × 100 m relay
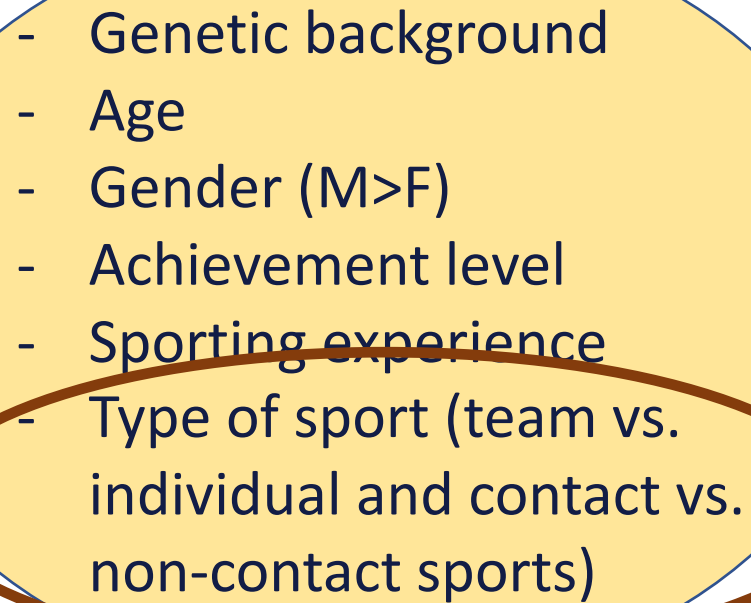2016: won an Olympic bronze medal in the 4 x 100 m
Noted as the fast starter.

https://www.youtube.com/watch?v=_iuPewWbp2U

References: https://en.wikipedia.org/wiki/Asha_Philiphttps://
www.kingston.ac.uk/news/article/1877/20-jun-2017-olympian-asha-philip-encourages-promising-athletes-to-dream-big-while-on-kingston-universitys-sports-performance/

What factors influence mental toughness (MT)?

- Genetic background
- Age
- Gender (M>F)
- Achievement level
- Sporting experience
- Type of sport (team vs. individual and contact vs. non-contact sports)

Not affected by:
- Physical performance of athletes

Not yet known:
- Educational qualifications
- Biological changes/maturation

Reference: Nicholls AR, Polman RCJ, Levy AR, Backhoused SH (2009) Personality and Individual Differences 47(1): 73-75.

Thank you for your attention!

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http://potecho.pte.hu

https://play.kahoot.it/v2/*?quizId=12226673-0dc0-4f52-a995-b9229ccbeb57