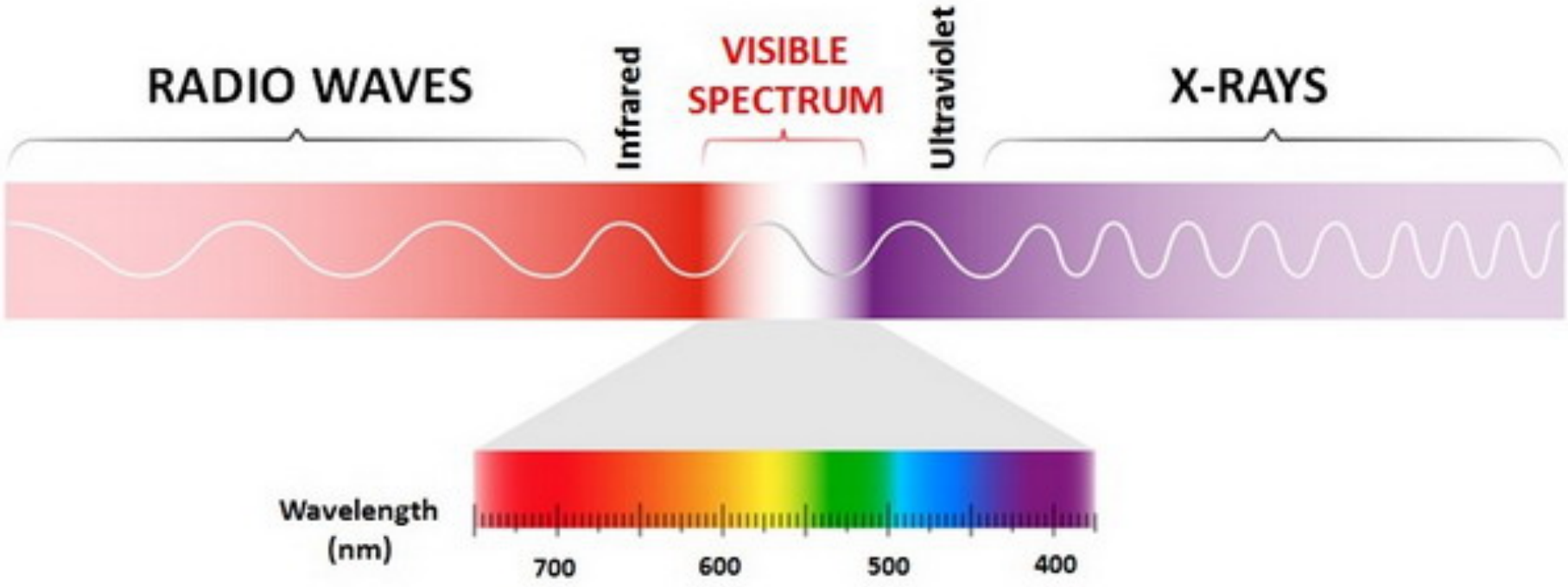
TERMAL RİSK ANALİZİ

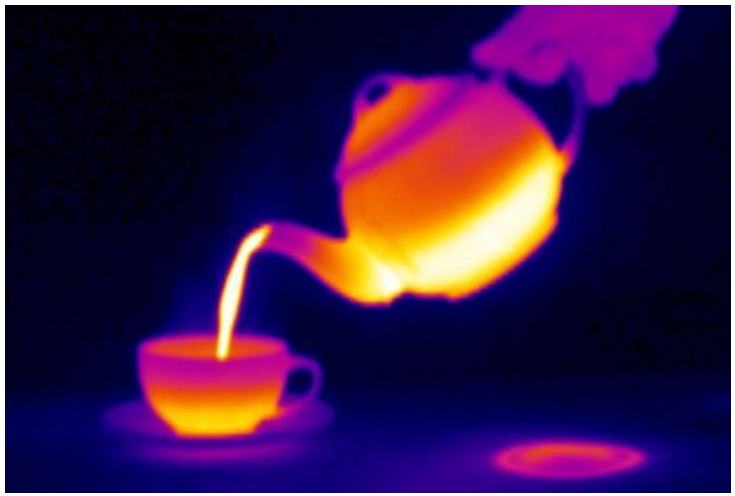
DOÇ. DR. NİHAN ÖZÜNLÜ PEKYAVAŞ

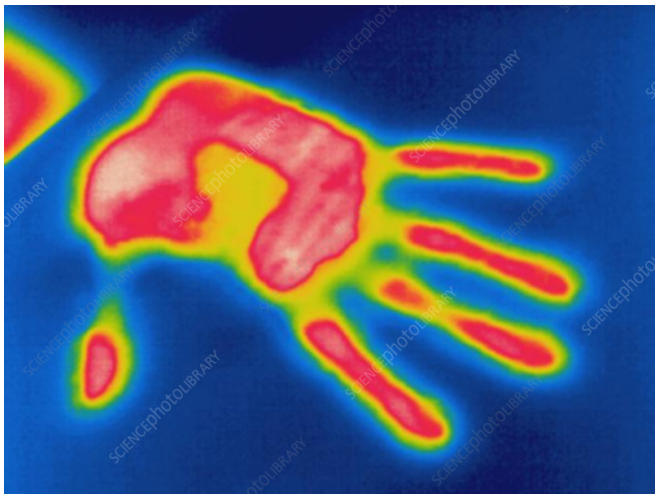
BAŞKENT ÜNİVERSİTESİ, SAĞLIK BİLİMLERİ FAKÜLTESİ

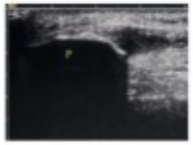
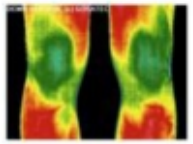
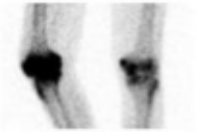
FİZYOTERAPİ ve REHABİLİTASYON BÖLÜMÜ

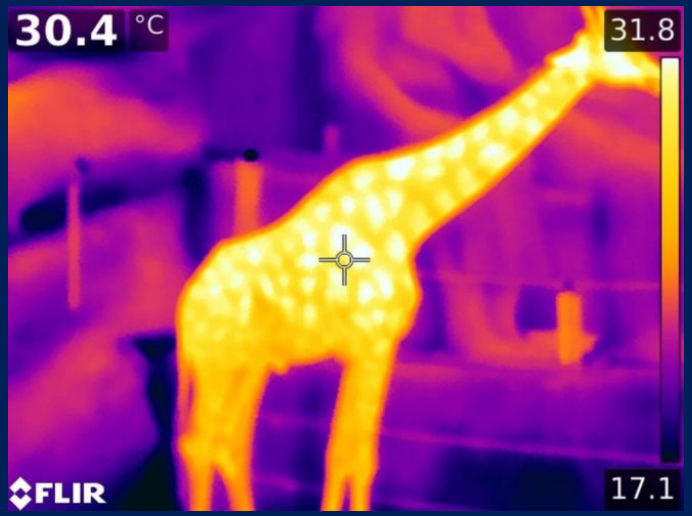
VISIBLE AND INVISIBLE LIGHT

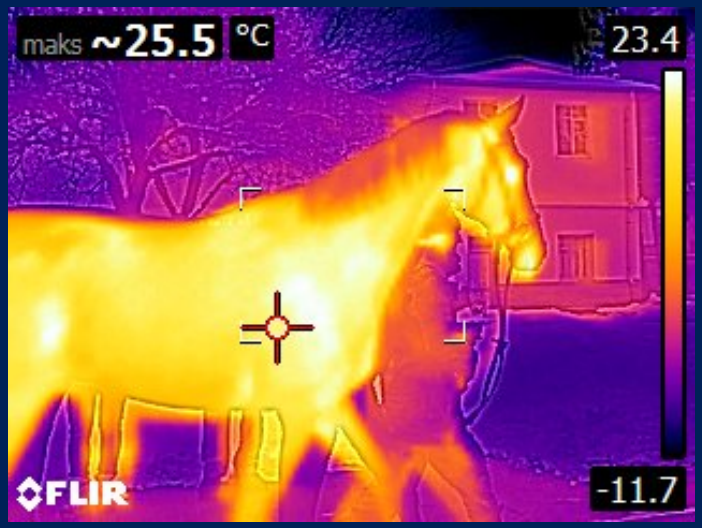


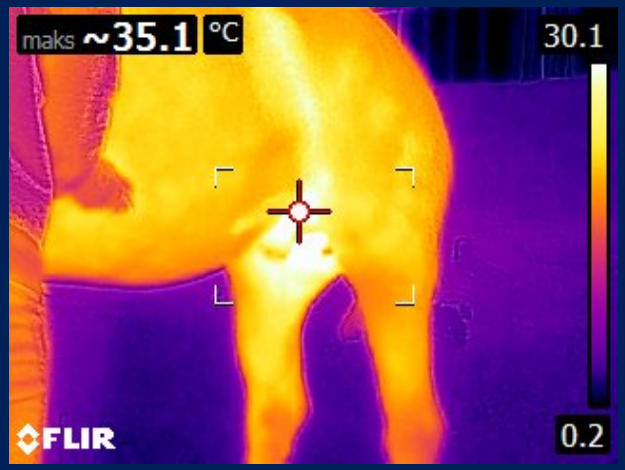




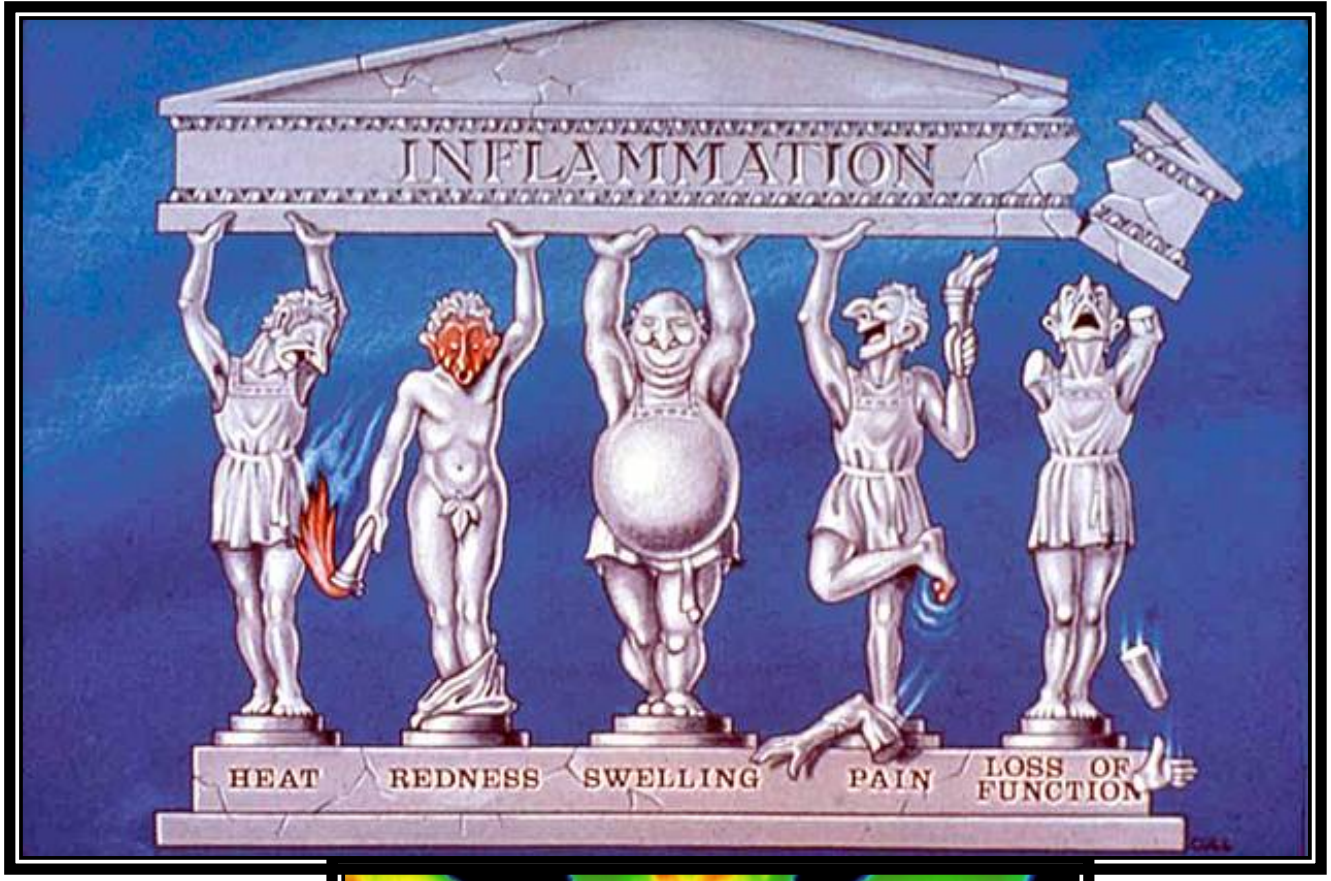
Radiation / Wavelength	Modality	Medical information
Radio Wave 10^{-3}	 MRI image	*Anatomy* Edema, flow Chemical composition
Microwave 10^{-2}	 Ultrasound	*Anatomy* Tissue structure characteristics, flow
Infrared 10^{-5}	 Infrared Imaging	*Anatomy* *and Physiology* Surface temperature
Visible Light 10^{-6}	 Arthroscopy	*Anatomy* Intraarticular structure, inflammation
Ultraviolet 10^{-8}	 UV-radiation	*Healing/Therapy* Skin, chronic Inflammation
X-Ray 10^{-10}	 X-Ray	*Anatomy* Bone injuries
Gamma ray 10^{-12}	 Scintigraphy	*Physiology* Inflammation, metabolism of the bone

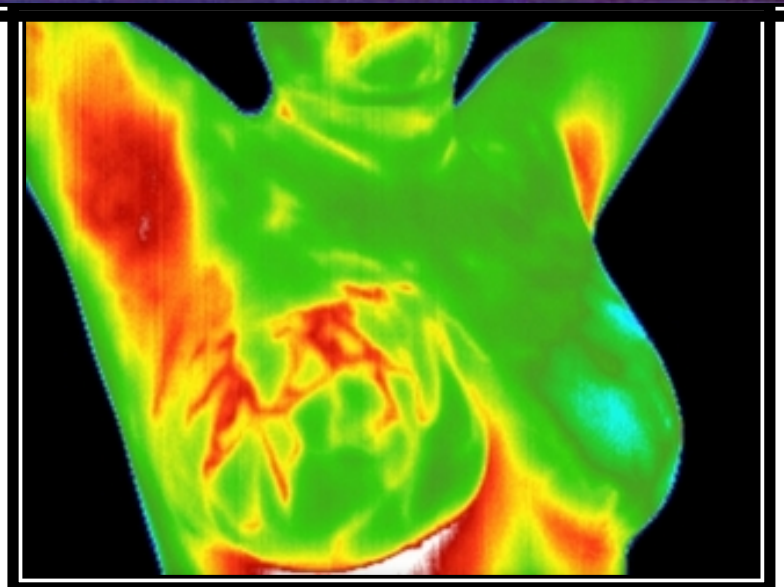






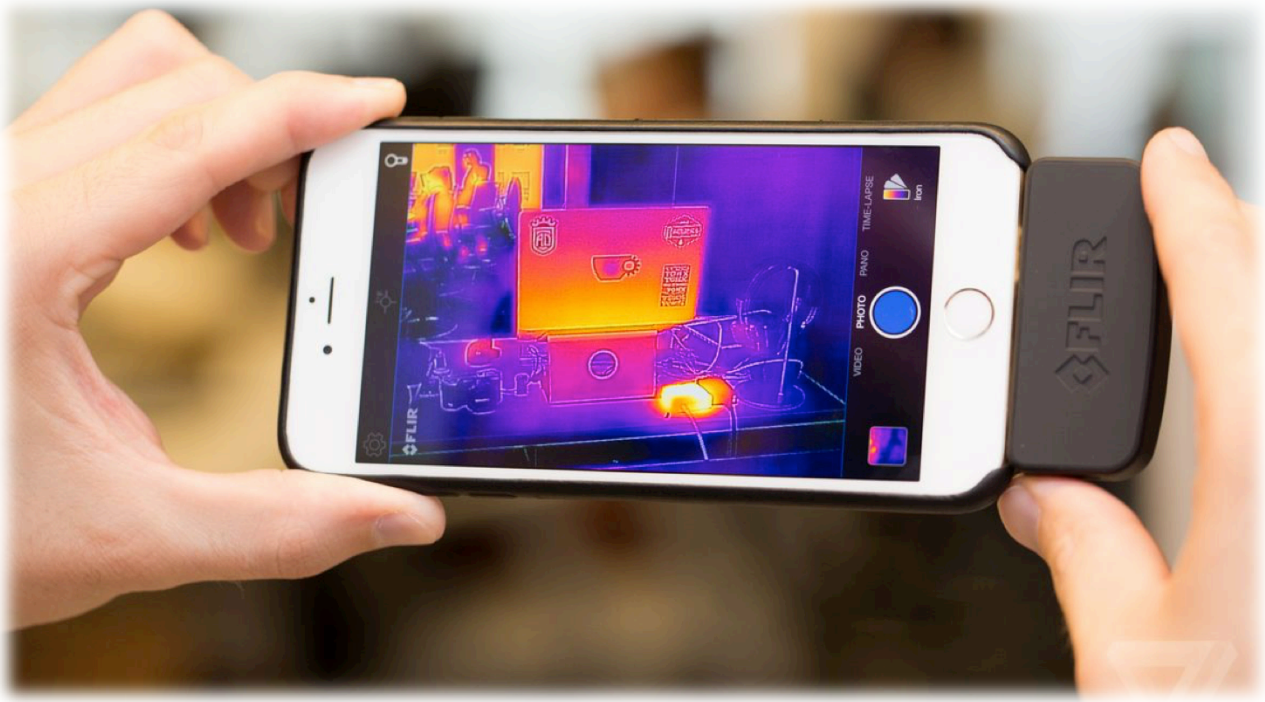
Ozunlu Pekyavas N, Cagatay S, Akpinar E, Baltacı G. Effects of EDF Taping on Wound Healing and Edema Control after Castration Surgery in Stallions of Equine. International Journal of Advances in Medical Sciences. Feb. 2018| Vol.3| Issue 2 |01-08


INFLAMMATION
HEAT
REDNESS
SWELLING
PAIN
LOSS OF FUNCTION

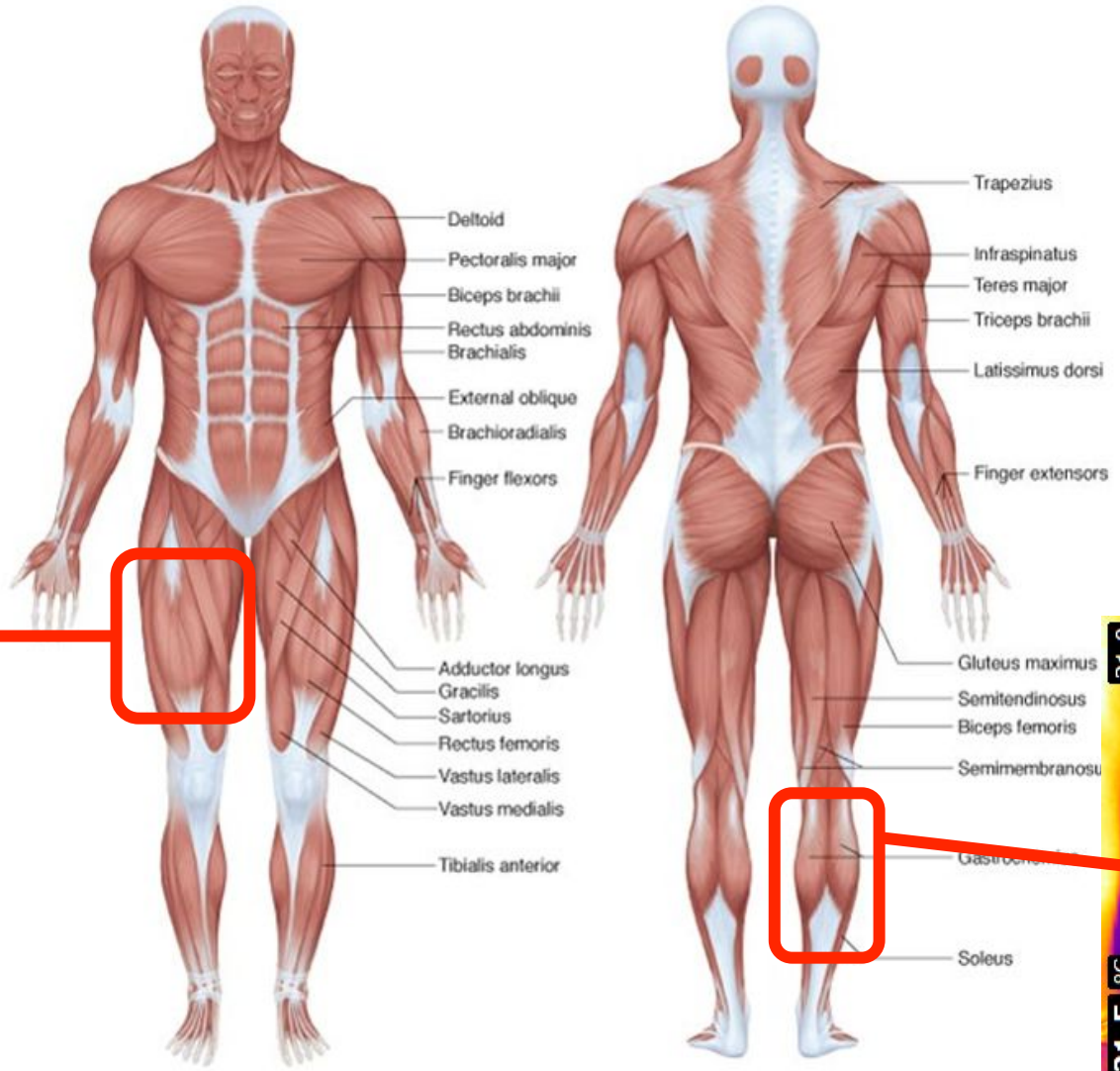


Güvenilir ve geçerli bir yöntem!

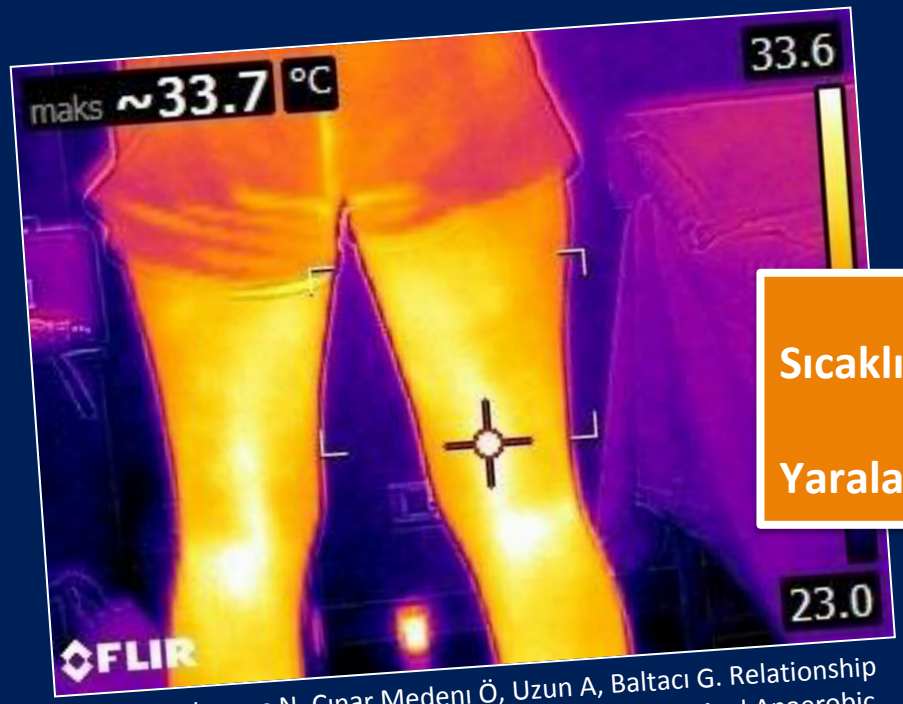
Coben R, Padolsky I. Infrared Imaging and Neurofeedback: Initial Reliability and Validity. Journal of Neurotherapy. 2008; 11(3): 3-13



TERMAL RİSK ANALİZİ



Gulsen M, Ozunlu Pekyavas N, Atıcı E, Sahin FN. Acta Medica Mediterranea, 2018, 34: 2037.

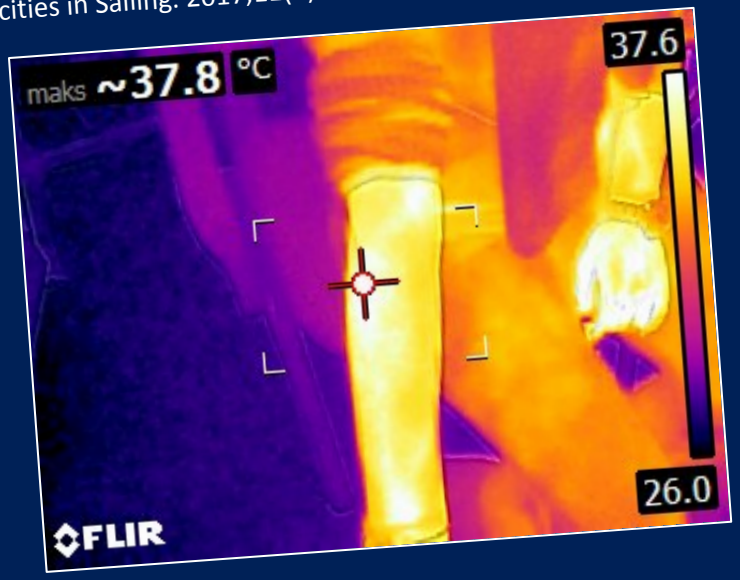


Özünlü Pekyavaş N, Cınar Medenı Ö, Uzun A, Baltacı G. Relationship Between Thigh Skin Temperature, Strength, Aerobic And Anaerobic Exercise Capacities in Sailing. 2017;11(2)

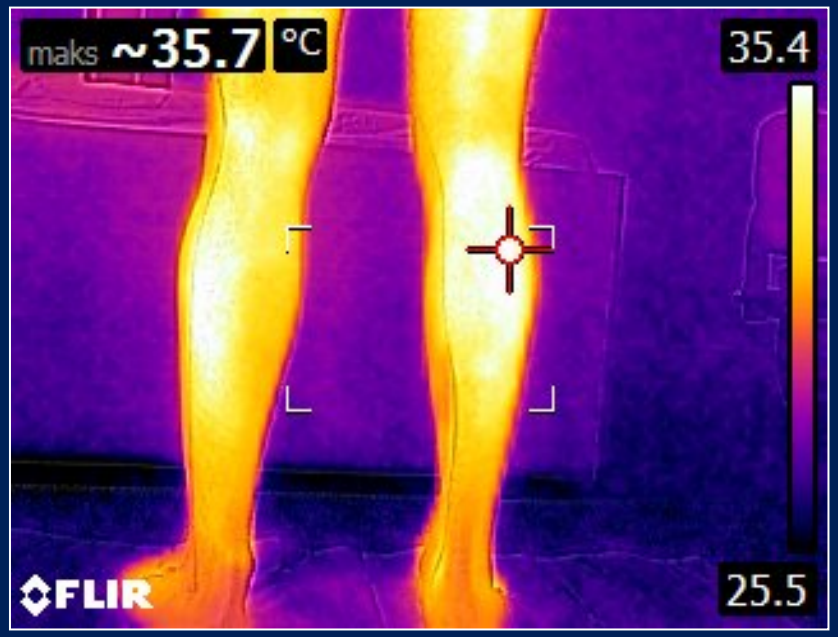
Sıcaklık ↑

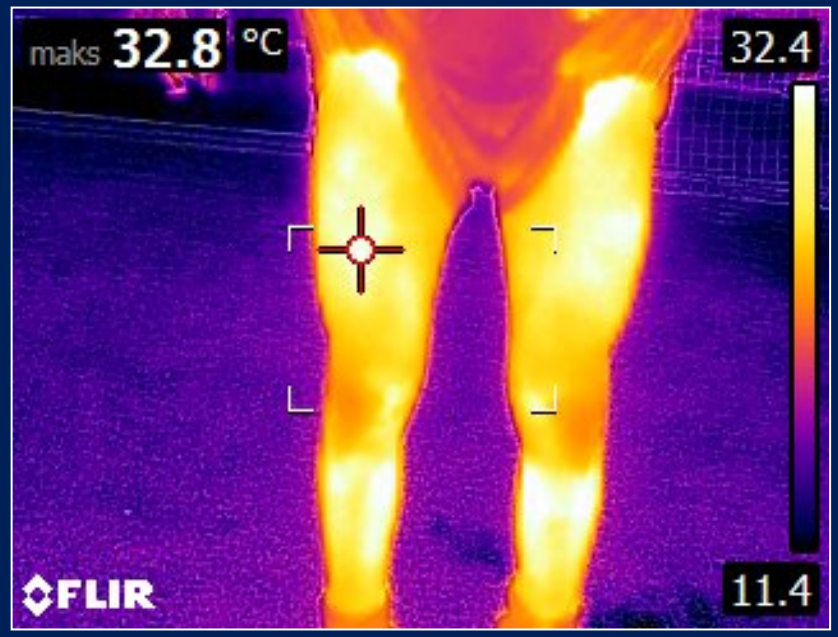
Yaralanma riski ↑

Cerezci S, Ozunlu Pekyavas N, Uzun A, Cinar Medeni O, Baltaci G, Er F, Suveren C, Colakoglu FF. Muscle Skin Temperature Responses for Hamstring and Quadriceps to Aerobic and Anaerobic Test Conditions in Turkish Olympic Sailing Athletes. Journal of Thermal Analysis and Caloriometry, 2019, 136: 2125-2130.



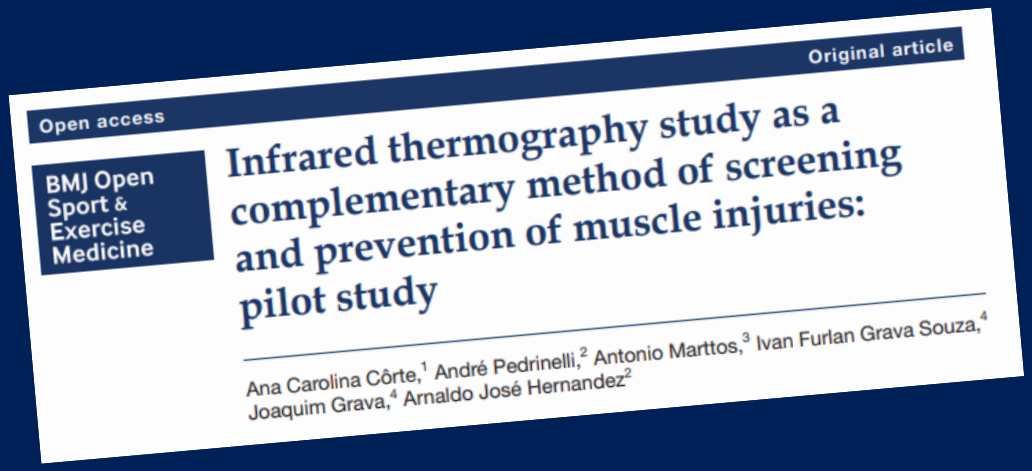
clipped [16,19].An inflammation in subcutaneous and deeper tissues can be reflected as superficial tissue temperature changes of ≥1°C. Modern infrared cameras have been claimed to be more than 10 times more sensitive in detecting temperature changes than the human hand and fingers that can detect a ≥2°C difference in temperature on a patient's skin [19].





Takım sporlarında görev alan sporcular daha fazla yaralanma riskine sahip

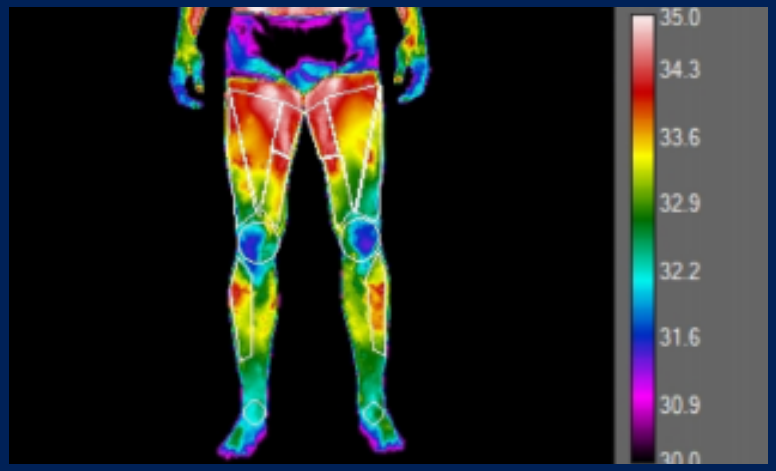
Özünlü Pekyavaş N, Özdemir F, Çınar Medeni Ö, Uzun A, Çolakoğlu FF, Baltacı G. Quadriceps ve gastrocnemius termografik kas aktivasyonu yapılan spordan etkilenir mi? Takım vs bireysel sporlar. 15. Uluslararası Spor Bilimleri Kongresi, Antalya. 15-18 Kasım 2017

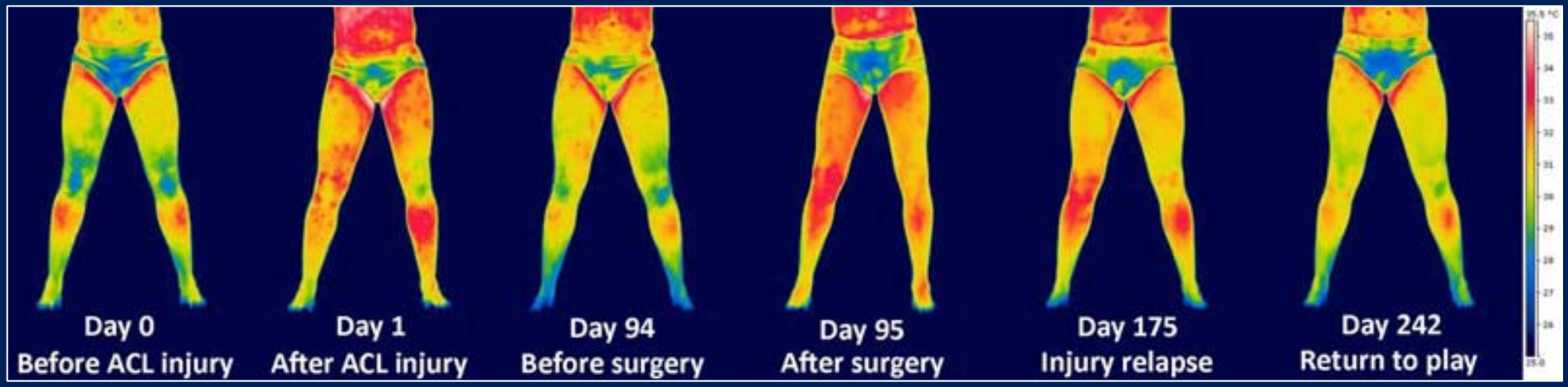

Open access Original article

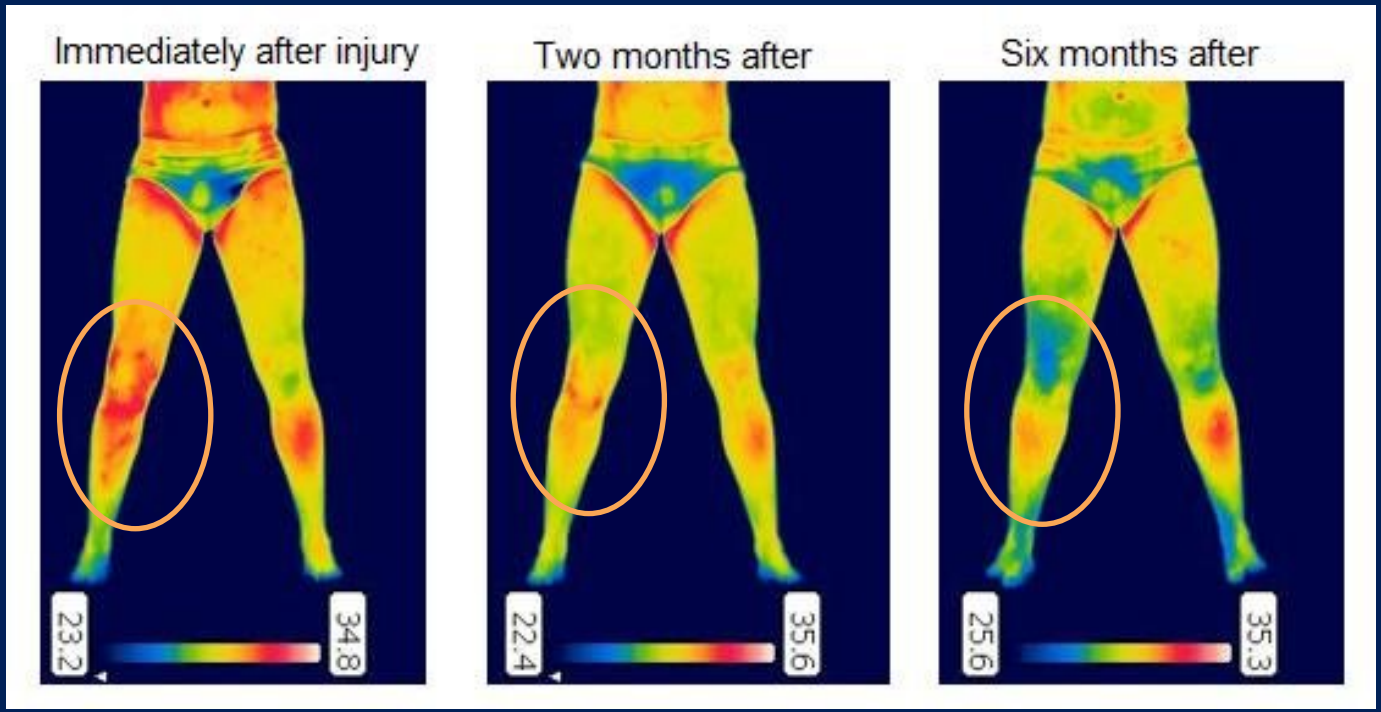
BMJ Open Sport & Exercise Medicine

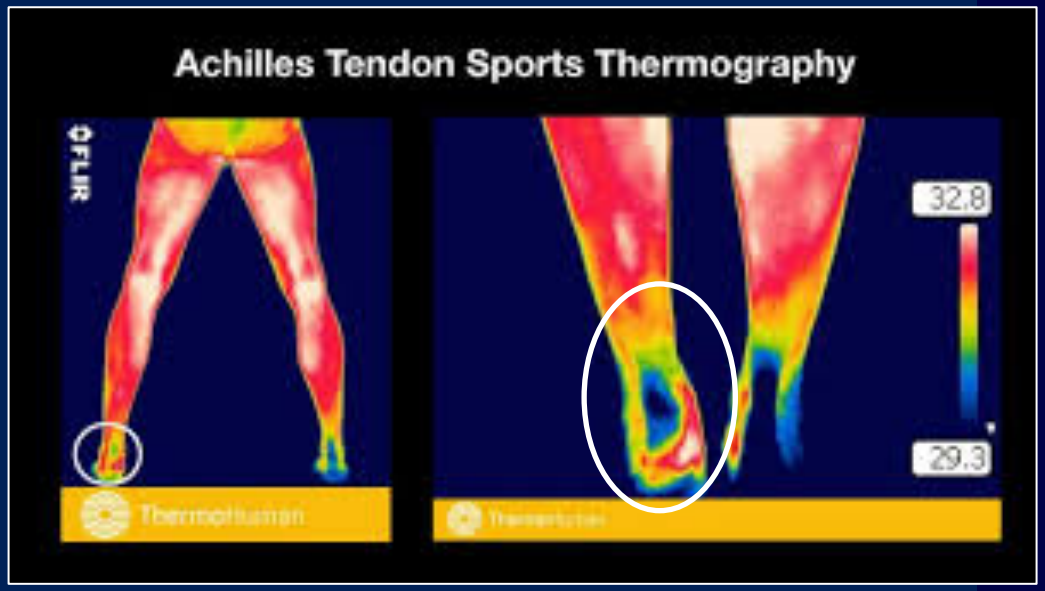
Infrared thermography study as a complementary method of screening and prevention of muscle injuries: pilot study

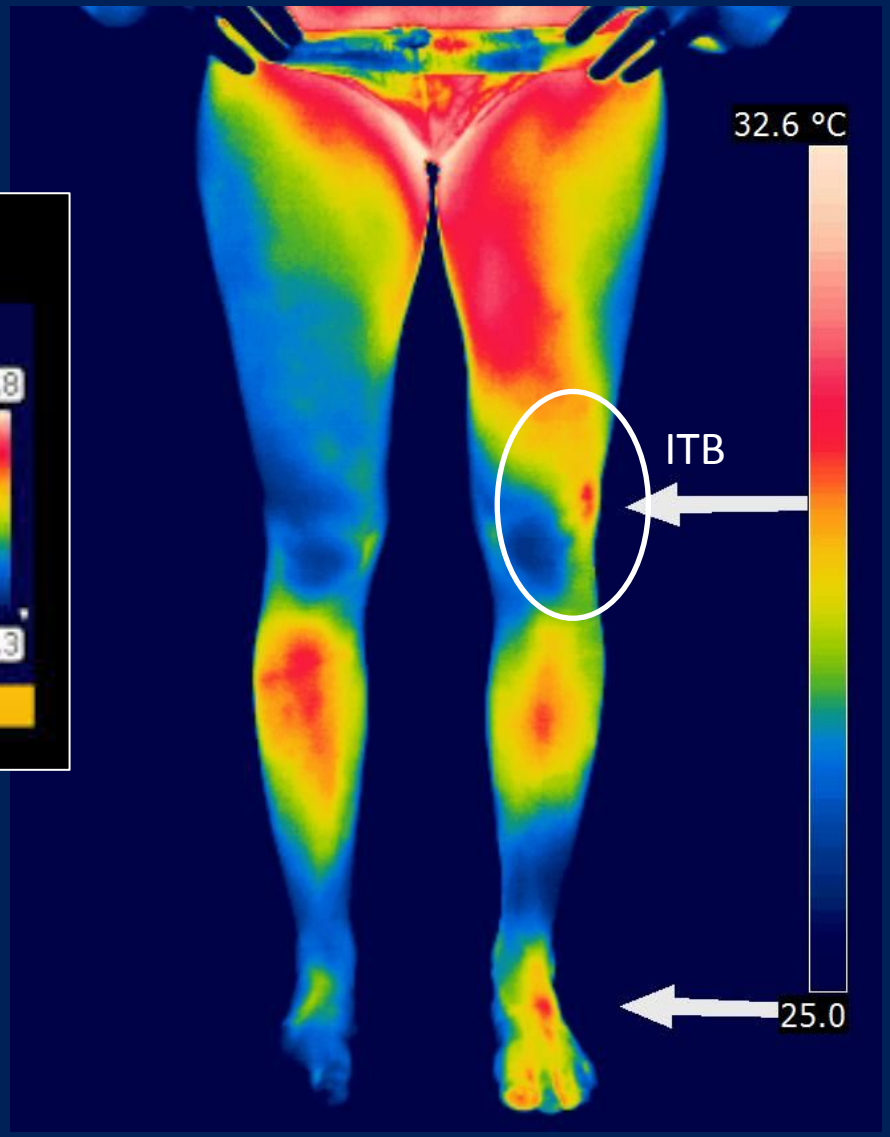
Ana Carolina Côrte,[1] André Pedrinelli,[2] Antonio Marttos,[3] Ivan Furlan Grava Souza,[4] Joaquim Grava,[4] Arnaldo José Hernandez[2]




Day 0
Before ACL injury
Day 1
After ACL injury
Day 94
Before surgery
Day 95
After surgery
Day 175
Injury relapse
Day 242
Return to play


Immediately after injury
23.2
34.8
Two months after
22.4
35.6
Six months after
25.6
35.3


Achilles Tendon Sports Thermography
FLIR
32.8
29.3


32.6 °C
ITB
25.0

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Thermographic imaging in sports and exercise medicine: A Delphi study and consensus statement on the measurement of human skin temperature

Danilo Gomes Moreira[a,y,*], Joseph T. Costello[b], Ciro J. Brito[c], Jakub G. Adamczyk[d], Kurt Ammer[e], Aaron J.E. Bach[f], Carlos M.A. Costa[g], Clare Eglin[b], Alex A. Fernandes[h], Ismael Fernández-Cuevas[i,y], José J.A. Ferreira[j], Damiano Formenti[k], Damien Fournet[l], George Havenith[m], Kevin Howell[n], Anna Jung[o], Glen P. Kenny[p], Eleazar S. Kolosovas-Machuca[q], Matthew J. Maley[r], Arcangelo Merla[r], David D. Pascoe[s], Jose L. Priego Quesada[t], Robert G. Schwartz[u], Adérito R.D. Seixas[v], James Selfe[w], Boris G. Vainer[x], Manuel Sillero-Quintana[y]

ÖLÇÜM YAPARKEN!!!

Table 2

Thermographic imaging in sports and exercise medicine (TISEM).

1) The relevant individual data of the participants must be provided. Note: These could include, but are not limited to, age, sex, body mass, height, body mass index, ethnicity and whether they are smokers or not. An indication of physical activity profile (e.g. frequency, duration, intensity, and activity description) should be reported. ❑ Yes ❑ No ❑ Unclear
2) Participants should be instructed to avoid alcohol beverages, smoking, caffeine, large meals, ointments, cosmetics and showering for four hours before the assessment. Also, sunbathing (e.g. UV sessions or direct sun without protection) should be avoided before the assessment. Note: This should be confirmed verbally before the assessment. The use of any medicinal treatments or drugs should be recorded. Any condition that could not be avoided should be reported. ❑ Yes ❑ No ❑ Unclear
3) Extrinsic factors affecting skin temperature (e.g. physical activity prior to the assessment, massage, electrotherapy, ultrasound, heat or cold exposure, cryotherapy) should be clearly described. ❑ Yes ❑ No ❑ Unclear
4) Ambient temperature and relative humidity of the location where the assessment took place must be recorded and reported as mean ± standard deviation. ❑ Yes ❑ No ❑ Unclear
5) The assessment should be completed away from any source of infrared radiation (e.g. electronic devices, lightning) or airflow (e.g. under an air conditioning unit). Note: Any condition that could not be controlled should be reported. ❑ Yes ❑ No ❑ Unclear
6) The manufacturer, model and accuracy of the camera used should be provided. Note: When available it is recommended to provide the maintenance information of the equipment (e.g. when and where it was completed the last calibration). ❑ Yes ❑ No ❑ Unclear
7) An acclimation period in the examination room should be completed. Note: This item is only applicable for initial baseline measurements or basal analysis. ❑ Yes ❑ No ❑ Unclear
8) If necessary the camera should be turned on for some time prior to the test to allow sensor stabilization following the manufacturer's guidelines. ❑ Yes ❑ No ❑ Unclear
9) Conditions of image recording such as mean distance between object and camera, percentage of the region of interest within the image should be detailed. ❑ Yes ❑ No ❑ Unclear
10) The camera should be positioned perpendicular to the region of interest. ❑ Yes ❑ No ❑ Unclear
11) Emissivity settings of the camera must be reported. Note: 0.98 of emissivity is suggested for a dry clean skin surface. ❑ Yes ❑ No ❑ Unclear
12) The time of day at which the images were taken should be reported. ❑ Yes ❑ No ❑ Unclear
13) The standard body position of the subject and the regions of interest must be well described and appropriately selected. A visual example (with temperature scale presented and scale of colors properly configured) is recommended. ❑ Yes ❑ No ❑ Unclear
14) If the skin is dried (e.g. to remove surface water), the drying method should be clearly described. ❑ Yes ❑ No ❑ Unclear
15) The evaluation of thermograms and collection of temperature from the software should be clearly described. ❑ Yes ❑ No ❑ Unclear

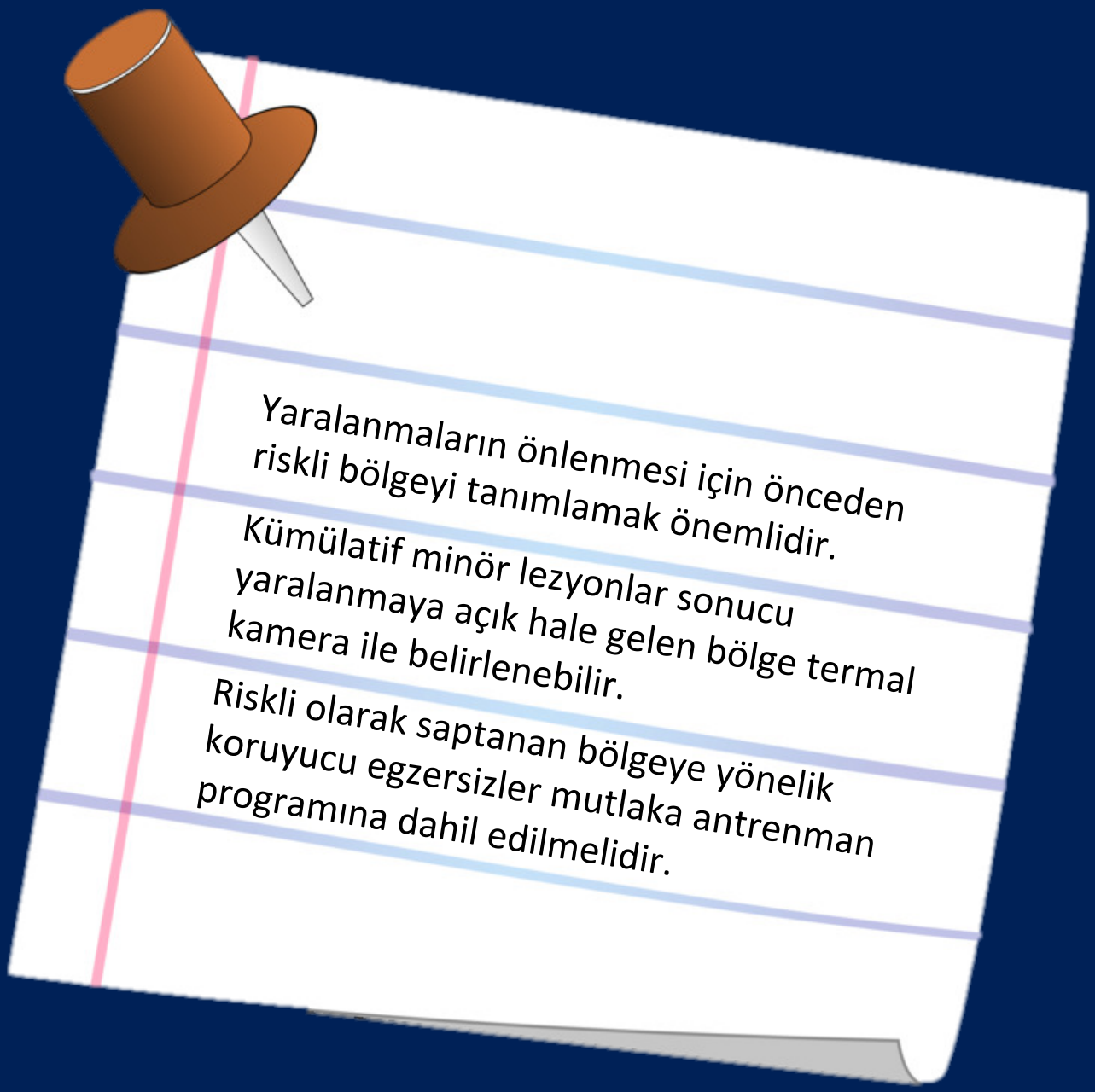
!!!DİKKAT EDİLMESİ GEREKENLER!!!

Ortam sıcaklığı 21-25°C

Ölçüm yapılacak odada 10-15 dk aklimatizasyon

Ölçüm kadrajında daha sıcak obje bulunmaması

Ölçüm yapılacak bölgeye 1 m uzaklık


Yaralanmaların önlenmesi için önceden riskli bölgeyi tanımlamak önemlidir.
Kümülatif minör lezyonlar sonucu yaralanmaya açık hale gelen bölge termal kamera ile belirlenebilir.
Riskli olarak saptanan bölgeye yönelik koruyucu egzersizler mutlaka antrenman programına dahil edilmelidir.