

Parameter	Anatomical Region and Tissue Type (reference)	Instrument/ Method	Population Size	Value at Lowest BMI	Value at Highest BMI	Relative % Change
Strand Thickness	Abdominal keratinocytes (Horie, 2018)	Ki-67 immunostaining and microscopy	n = 50, females	4.7	11.9	153.20%
	Forearm epidermal cell size (Altintas, 2016)	Reflectance-mode confocal microscopy (RCM)	n = 20	772.6	821.3	6.30%
	Forearm epidermal thickness (Altintas, 2016)	Reflectance-mode confocal microscopy (RCM)	n = 20	44	54.8	24.50%
	Abdominal epidermal area (Horie, 2018)	Hematoxylin/eosin staining, and microscopy	n = 50, females	0.045	0.06	33.30%
	Face surface roughness (Mori, 2017)	Polarized images VisioScan VC98	n = 93	1.08	1.83	69.40%
	Forearm stratum corneum moisture (de Farias Pires, 2016)	Corneometer CM820	n = 492, males	23.7	13.65	-73.60%
	Abdominal Epidermal Hydration –inverted U (Monteiro Rodrigues, 2017)	MoistureMeter SC	n = 847, females	33.25	23.7	-38.60%
	Breast (Monteiro Rodrigues, 2017)			45.7	69.7	52.50%
	Forehead (Monteiro Rodrigues, 2017)			49.9	46.1	-7.60%
	Zygomatic area (Monteiro Rodrigues, 2017)			48.5	44.9	-7.40%
Lipid	Abdominal Cholesterol (Horie, 2018)	Cholesterol E-Test, NEFA C-Test	n = 50, females	2.4	1.4	-41.70%
	Abdominal Fatty acids (Horie, 2018)			3.8	1.95	-48.70%
	Abdomen –dermal thickness (Matsumoto, 2014)	DermaScan Ultra	n = 90, males	1.53	1.72	12.42%
	Thigh –dermal thickness (Matsumoto, 2014)			1.39	1.65	18.71%
	Upper arm –dermal thickness (Matsumoto, 2014)			1.51	1.8	19.21%
	Abdominal and thigh dermal thickness (Derraik, 2014)	Phillips IU-22 ultrasound machine	n = 140	1.7	2.3	35%
	Rear upper arm epidermis & dermis (Gibney, 2010)	Cortex DermaScanC	n = 388	2.1	2.4	14.30%
	Anterior upper thigh epidermis & dermis (Gibney, 2010)			1.7	2	17.60%
	Anterior abdominal epidermis & dermis (Gibney, 2010)			2.1	2.2	4.80%
	Outer buttocks epidermis & dermis (Gibney, 2010)			2.3	2.7	17.40%
Strand Thickness	Dorsal foot (heel) skin thickness [mm] [skin & subcutaneous tissues] (Jacopi, 2020)	Logiq 7pro ultrasound system	n = 120	1.11	1.4	26%
	Dorsal foot (under scaphoid) Skin thickness [mm] [skin & subcutaneous tissues] (Jacopi, 2020)			0.57	0.65	14%
	Upper back (shoulders) dermal thickness (Smalls, 2006)	DermaScanC ultrasound	n = 22	nr	nr	r = -0.46
	Abdomen (Monteiro Rodrigues, 2017)	Tewameter TM300	n = 89	6.4	7.9	23.44%
	Breast (Monteiro Rodrigues, 2017)			7.3	15.8	116.44%
	Forehead (Monteiro Rodrigues, 2017)			9.6	15.3	59.38%
	Zygomatic area (Monteiro Rodrigues, 2017)			11.7	16.3	39.32%
	Face (right cheek) (Mori, 2017)	Tewameter MPA500	n = 93	17.6	19.4	10.23%
	Forearm (Guisa, 2010)	VapoMeter SLO3 Defini	n = 80	18.5	10.8	-41.62%
	Forearm (Loffler, 2002)	Tewameter TM210	n = 63	6.9	11.5	66.67%
TEWL	Forearm collagen content (Black, 1971)	5 mm punch biopsies	n = 16	nr	nr	no change in content, thus density must decrease
	Abdominal collagen bundle thickness (Light, 2010)	Histological staining and light microscopy	n = 10	nr	nr	decreased thickness –degraded and disorganized matrix
	Back collagen bundle thickness (Light, 2010)			nr	nr	
	Papillary dermis collagen fiber thickness [µm] (Sami, 2015)	Hematoxylin Eosin, and Mallory staining and Image Analyzer System (Leica Q500 MC program)	n = 30	1.78	2.19	23%
	Reticular dermis collagen fiber thickness [µm] (Sami, 2015)			9.32	9.03	-3.10%
	Abdominal (epigastrum) collagen concentration (Drphee, 2010)	Image Analyzer System (Kontron Electronic 300, Zeiss, Germany)	n = 80	58.6	46.4	-20.80%
	Abdominal (hypogastrum) collagen concentration (Drphee, 2010)			52.4	47.6	-10%
	Upper arm –upper dermis collagen density (Matsumoto, 2014)	DermaScanC ultrasound	n = 80, males	12	11.2	-6.70%
	Upper arm –lower dermis collagen density (Matsumoto, 2014)			6.4	5.2	-18.80%
	Abdomen –upper dermis collagen density (Matsumoto, 2014)			11.7	9.8	-16.20%
Collagen	Abdomen –lower dermis collagen density (Matsumoto, 2014)			7.7	5.4	-29.90%
	Thigh –upper dermis collagen density (Matsumoto, 2014)			18.3	16.4	-10.40%
	Thigh –lower dermis collagen density (Matsumoto, 2014)			12.1	8.6	-28.90%
	Thigh collagen density (Ibuki, 2018)	DermaScanC ultrasound	n = 69, males	nr	nr	low collagen density associated with high oxidative stress
	Papillary dermis collagen density [µm] (Sami, 2015)	Hematoxylin Eosin, and Mallory staining and Image Analyzer System (Leica Q500 MC program)	n = 30	53.47	56.41	5.30%
	Reticular dermis collagen density [µm] (Sami, 2015)			67.12	68.72	2.40%
	Abdominal fat cell size (Jansson, 1992)	Sectioned, sliced and treated with collagenase	n = 16	83	107	28.90%
	Femoral fat cell size (Jansson, 1992)	Immunohistochemistry	n = 17	94	108	14.90%
	Subcutaneous adipose tissue adipocyte cell size [µm ²] (Gealekman, 2011)			1427	1818	27.40%
	Abdominal and thigh subcutis thickness [mm] (Derraik, 2014)	Phillips IU-22 ultrasound machine	n = 140	8.8	28.8	227%
Size and Thickness	Rear upper arm SAT (Gibney, 2010)	GE LOGIQe ultrasound	n = 388	7.7	13.5	75.30%
	Anterior upper thigh SAT (Gibney, 2010)			7.8	12.6	61.50%
	Anterior abdomen SAT (Gibney, 2010)			9.5	17.3	82.10%
	Outer buttocks SAT (Gibney, 2010)			13.7	16.6	21.20%
	Forearm lipid concentration (Taroni, 2003)	Time-resolved reflectance and transmittance spectroscopy	n = 2	64	86	34.30%
	Breast lipid content (Spinelli, 2004)	Multiwavelength time-resolved optical mammography	n = 113	54.4	66.1	21.50%
	Abdominal subcutaneous fat [kg] (Jansson, 2002)	Magnetic resonance imaging	n = 173, males	2.08	4.26	104.80%
	Forearm water concentration (Taroni, 2003)	Time-resolved reflectance and transmittance spectroscopy	n = 101, females	2.66	4.25	59.80%
	Breast water content (Spinelli, 2004)	Multiwavelength time-resolved optical mammography	n = 113	18.9	2.4	-87.30%
	Abdomen (Laaksonen, 2003)	Dielectric constant	n = 27	27.8	23.3	-16.20%
Lipid	Collagen V (Spencer, 2011)	RT-PCR and immunohistochemistry (IHC)	n = 17	10.9	18	65.10%
	Eumelanin –abdominal visceral adipose tissue measured as PTCA in ng/µl (Randhawa, 2009)	LC-UV-MS, immunohistochemical staining, and L-(U-14C) Tyrosine assay	n = 10	0.05	0.19	280%
	Subcutaneous connective tissue from lower dermis – fluorescence (Gietzi, 1992)	LS48 Perkin-Elmer spectrofluorometer	n = 26	nr	nr	No significant correlation with BMI
	Carotid artery vessel thickness [mm] (Vinet, 2010)	High-resolution vascular ultrasonography	n = 16	0.5	0.62	24%
	Forearm (volar) capillary density (Altintas, 2016)	Confocal microscopy gallium-arsenide laser	n = 20	6.02	4.91	-18.40%
	Finger, dorsum, capillary density (Caerlichow, 2010)	Capillaroscopy –video microscopy	n = 250	91.8	88.6	-3.50%
	Finger, dorsum capillary density (Debbabi, 2006)	Intravital video-microscopy	n = 170	OW/NHT: 68.2 ± 11.5	OW/NHT: untreated 59.6	-12%
	SAT & visceral tissue capillary density (Gealekman, 2011)	Immunohistochemistry & microscopy (lumens/mm ²)	n = 17	OW/OB: 94.27	MOB: 43.3	-54%
	Finger, dorsum, capillary density at rest (Francischetti, 2011)	Video microscopy	n = 125	135.2	132.3	-2.10%
	Finger, dorsum, capillary recruitment (Francischetti, 2011)			8.7	1.8	-79.30%
Capillary	Nailfold capillary recruitment (De Jongh, 2004)	Capillaroscopy	n = 28	37.4	56.2	33.50%
	Finger, dorsum, capillary recruitment (Caerlichow, 2010)	Capillaroscopy –video microscopy	n = 250	5.4	9.5	75.93%
	Finger Nailfold cutaneous blood flow (Chin, 1999)	Laser doppler flowmetry and capillaroscopy	n = 34, children	71.8	123.4	123.40%
	Face (right cheek) cutaneous blood flow (Mori, 2017)	Laser speckle blood flow system, PeriCam PSI NR	n = 93, females	117.8	147.5	25.20%
	Forearm (volar) dermal blood cell blood flow (Altintas, 2016)	Confocal microscopy gallium-arsenide laser	n = 20	51.1	63.1	23.50%
	Forearm blood flow (Loffler, 2002)	Laser Doppler (PF 5010, Perimed)	n = 62	5.6	7.7	37.50%
	Brachial artery peak blood flow (Vinet, 2010)	Ultrasonography with Doppler	n = 16	398	229	-73.80%
	Leg blood flow (Vinet, 2010)			36.9	21.5	-41.60%
	Abdomen, gluteal region, front of the thigh fatty blood flow (Larsen, 1996)	Xe-clearance	n = 69	nr	nr	-39.50%
	Abdominal ATBF (Jansson, 1992)	Xe-clearance	n = 16	3.2	1.6	-50%
Blood flow	Femoral ATBF (Jansson, 1992)	Xe-clearance	n = 27	2.7	2.4	-11.10%
	Abdominal subcutaneous ATBF (Bolinder, 2000)	Xe-clearance	n = 26	1.895	1.158	-39%
	Abdominal subcutaneous ATBF (Jansson, 1998)	Xe-clearance	n = 24	3.4	1.7	-50%
	Abdominal SAT (Jansson, 1998)	Xe-clearance	n = 31	08.2.4	08(20):1.7	-29.20%
	Abdominal wall (Mitsuo, 2010)	Xe-clearance	n = 37	1319	648	-50.90%
	Forearm (Monteiro Rodrigues, 2017)	Venous occlusion Plethysmography	n = 10	14.6	10.7	-24.40%
	Forearm total hemoglobin concentration [µM] (Taroni, 2003)	Time-resolved reflectance and transmittance spectroscopy	n = 2	169	32	-81%
	Breast total hemoglobin [µM] (Spinelli, 2004)	Multiwavelength time-resolved optical mammography	n = 113	17.4	11.4	-34.50%
	Face (right cheek) [cell/mm ³] (Mori, 2017)	NIRS-based tissue-blood oxygenation monitor, 80M-LTRSF	n = 93, females	7.3	7.33	-4.30%
	Circulatory hemoglobin [mg/dL] –inverted u-shaped (Ghadiri-Kean, 2014)	Fasting blood samples	n = 406	13.2	13.5	2.3% non.sig. increase
Hemoglobin	Blood hemoglobin concentration [g/dL] (Hung, 2019)	Blood test - Hb positive correlation in pre- and post-bariatric surgery	n = 221	13.2	14.2	7.60%
	Circulatory hemoglobin (Aster, 2017)	Cyanmethemoglobin Method	n = 200	nr	nr	significantly increased
	Glycosylated hemoglobin (A1c, or HbA1c) (Das, 2014)	Boronate affinity method	n = 120	nr	nr	positive correlation with BMI
Glycosylated hemoglobin (A1c, or HbA1c) (Das, 2016)	Boronate affinity method	n = 180	nr	nr	positive correlation with BMI, increasing r with obesity group	