Table 2. Raman spectroscopy assigned signals and corresponding groups for each tissue present in the human joint.

Peak (cm^{-1})	**Assignment (*v*: vibration mode)**	**Molecular Component**	**Joint Tissue**	**References (first author, year)**
431	v_2 PO_4^{3-}	Phosphate Apatite	Bone	Khan, 2013
581	v_4 PO_4^{3-}	Phosphate Apatite	Bone	Khan, 2013
664	v_4 CO_3^{2-}	A-type carbonate	Bone	Khan, 2013
730	v_4 CO_3^{2-}	B-type carbonate	Bone	Khan, 2013
850-880 856-8 875-80	Cyclic C-C stretch: - *Pro* (C-C-N) - *Hyp* (HO-C-C-N)	Collagen	Cartilage, synovium fluid, tendon, ligament, meniscus	Esmonde-White, 2009; Lim, 2011; Richardson, 2015; Levillain, 2015; Bergloht, 2016
920-2	*Pro* C-C stretch	Collagen	Cartilage, synovium fluid, tendon, ligament,	Esmonde-White, 2009; Esmonde-White, 2011; Richardson, 2015
937-40	C-O-C from α1-4 glucosidic bound - symmetric stretch	GAGs	Cartilage, synovium fluid	Esmonde-White, 2009; Lim, 2011;
	C-C stretch	Proteins	Cartilage, tendon, ligament	Richardson, 2015; Kunstar, 2012; Lim, 2011
954-60	v_1 PO_4^{3-}, symmetric stretch	Phosphate Apatite	Bone	Esmonde-White, 2011; Lim, 2011; Kunstar, 2012; Buchwald, 2012; Richardson, 2015; Casal-Beiroa, 2018; Casal-Beiroa, 2019
1001-4	Phe, aromatic ring stretch	Proteins	Cartilage, synovium fluid, tendon, ligament, meniscus	Dehring, 2006; Esmonde-White, 2009; Esmonde-White, 2011; Kunstar, 2012; Richardson, 2015; Levillain, 2015; Casal-Beiroa, 2018; Casal-Beiroa, 2019; Casal-Beiroa, 2020
1039-50	Piranose ring, C-O-C stretch	GAGs	Cartilage	Lim, 2011; Casal-Beiroa, 2019
1060-4	OSO_3^-, symmetric stretch	Sulfated GAGs, PGs	Cartilage, tendon, ligament	Esmonde-White, 2011; Lim, 2011; Kunstar, 2012; Gamsjaeger, 2014; Kumar, 2015, Casal-Beiroa, 2018; Casal-Beiroa, 2019; Casal-Beiroa, 2020
1070	v_1 CO_3^{2-}, symmetric stretch	B-type carbonate	Cartilage, bone	Esmonde-White, 2011; Buchwald, 2012; Khan, 2013; Gamsjaeger, 2014

1114	$\nu_1 CO_3^{2-}$, symmetric stretch	A-type carbonate	Bone	Khan, 2013
1126-70	C C-C_6H_5 stretch	Carbohydrates, GAGs	Cartilage	Lim, 2011
1230-1280 1238-45 1260-70	Amide III – C-N stretch - Random coil - α-helix secondary structure	Collagen - Defective - Functional	Cartilage, synovium fluid, tendon, ligament, meniscus, subchondral bone, bone	Dehring, 2006; Esmonde-White, 2009; Lim et, 2011; Buchwald, 2012; Gamsjaeger, 2014; Richardson, 2015; Takahashi, 2014; Kumar et, 2015; Levillain, 2015; Casal-Beiroa, 2018; Casal-Beiroa, 2019; Casal-Beiroa, 2020
1370	COO^- symmetric stretch	HA, GAGs, PGs	Cartilage, synovium fluid, tendon, ligament	Esmonde-White, 2009
1375-7	CH_3 symmetric stretch	GAGs, PGs	Cartilage	Gamsjaeger, 2014; Casal-Beiroa, 2018; Casal-Beiroa, 2019
1439	$=CH_2$ deformation	Lipids	Cartilage, tendon, ligament, bone subchondral and cancellous bone	Esmonde-White, 2011; Buchwald, 2012
1441-60	CH_2 scissoring	Lipids and proteins (organic content)	Cartilage, tendon, ligament, meniscus, subchondral and cancellous bone	Dehring, 2006; Esmonde-White, 2011; Richardson, 2015; Levillain, 2015; Mansfield, 2017; Casal-Beiroa, 2018; Casal-Beiroa, 2019
1630-1690 1645-55 1660-70 1665-75	Amide I - C=O α- helix stretch - C=O random coil stretch - C=O β-sheet stretch	Collagen and other proteins	Cartilage, tendon, ligament, meniscus, subchondral bone, bone	Dehring, 2006; Esmonde-White, 2009; Esmonde-White, 2011; Kunstar, 2012; Buchwald, 2012; Richardson, 2015; Levillain, 2015, Casal-Beiroa, 2018; Casal-Beiroa, 2019
1654-7	C=C, symmetric stretch	Lipids	Cancellous bone	Esmonde-White, 2011
1745	C=O, symmetric stretch	Lipids	Cancellous bone	Esmonde-White, 2011
2845-980 2845 2850 2980	CH_2 symmetric stretch (satured) symmetric stretch (insatured) anti-symmetric stretch	Lipids	Cartilage, synovium fluid, tendon, ligament, subchondral bone, bone	Mansfield, 2017
2930	CH_3 symmetric stretch	Lipids and proteins	Cartilage, synovium fluid, tendon, ligament, subchondral bone, bone	Mansfield, 2017

Obs: GAGS – glycosaminoglycans, PG – proteoglycans, HA – hyaluronan.