

Anthropometric and Imaging Based Prediction of Hamstring Tendon Length and Graft Diameter in Knee Ligament Reconstruction. A Systematic Review.

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INTRODUCTION

Knee ligament reconstruction requires specific dimensions of the hamstring tendon length and final graft diameter for different fixation and graft preparation methods [1-5]. Furthermore, hamstring tendon length is relevant especially in cases of complex knee ligament reconstruction [4].

Identifying those patients at risk for inadequate graft size preoperatively would allow for optimal preoperative planning, hence the possibility to arrange alternative graft sources, and appropriate patient counseling.

AIM

To summarize the evidence regarding the relation between imaging and anthropometric measurements to either hamstring autograft diameter or tendon length.

METHOD

All major databases (see flow chart) were searched until November 7th 2016. Animal studies and studies regarding secondary harvested tendons were excluded.

A modified Dutch checklist form for prognosis (Cochrane Netherlands) was used to assess risk of bias of the included studies.

Due to data heterogeneity a Best evidence synthesis was used for data analysis.

RESULTS

Figure 1. Study Flow Chart

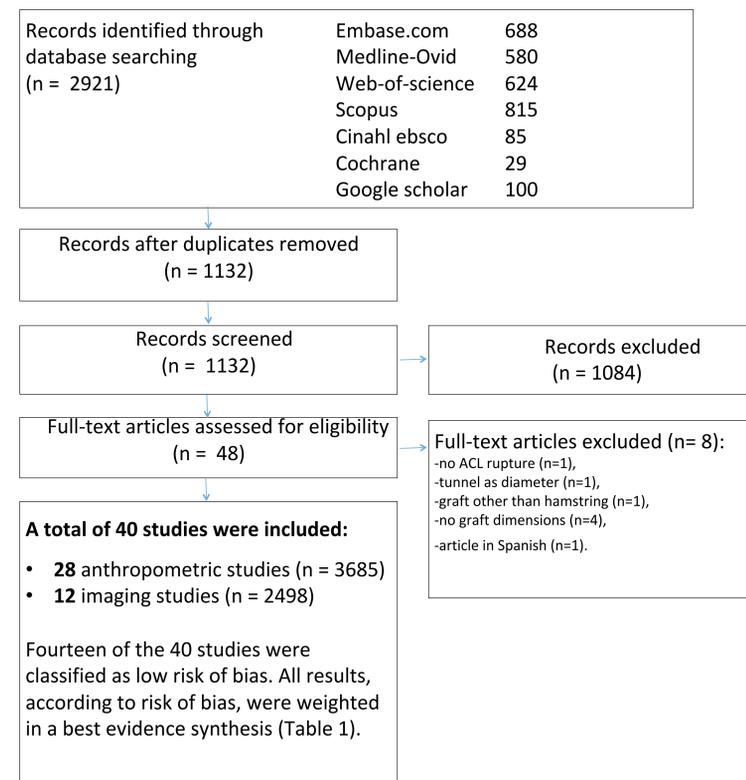


Table 1. Best Evidence Synthesis:

summary of positive relationship (X) between graft dimensions and anthropometric/imaging parameters.

Determinant	Graft diameter	Semitendinosus tendon length	Gracilis tendon length
<i>Anthropometric parameters</i>			
Age			
Height	X	X	X
Weight			
BMI			
Female (smaller diameter)	X		
Thigh circumference			
Thigh length	X	X	
Tibia length			
Leg length	X	X	
Activity level			
<i>Imaging parameters</i>			
GT+ST MRI CSA	X		
GT+ST MRI diameter			
GT+ST US CSA			
GT+ST US diameter			

Abbreviations: BMI, body mass index; GT, gracilis tendon; ST, semitendinosus tendon; MRI, magnetic resonance imaging; CSA, cross-sectional area; US, ultrasound

CONCLUSIONS

Hamstring graft diameter is positively related to height, leg length, and thigh length.

Hamstring graft diameter is smaller in women than in men.

Semitendinosus tendon length is positively related to height, thigh length, and leg length.

Gracilis tendon length is positively related to height.

MRI is the current best image modality in hamstring graft diameter prediction with a positive relation between MRI cross-sectional area of the hamstring tendons and final graft diameter.

Future research should aim at improving imaging quality techniques, standardizing imaging, and anthropometric protocols.

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