AVERAGE LENGTH OF SEMI TENDINUSUS AND GRACILIS TENDONS IN KHBER PAKHTOONKHWA POPULATION

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Abstract

Background and Aim: The average length of semi tendinusus and Gracilis tendons in Pakistani population is not determined for the reconstruction of ACL . Till now, no studies have been done on Khyber pakhtoonkhwa population of Pakistan .

Methods: We evaluated 75 consecutive patients (58males, 17 females) prospectively with anterior cruciate ligament deficiency scheduled for reconstruction using hamstring auto graft at Peshawar between June 2013 and June 2015. Preoperatively we recorded age, gender, height and weight. Intraoperative measurements of semitendinosus and Gracilis tendons like absolute length and final diameter of the tripled graft using sizing tubes calibrated to 1 mm.

Results: As per study the average length of both the Semi tendinusus and Gracilis tendons Khyber pukhtoonkhwa population of Pakistan is good enough to be used conveniently for reconstruction of ACL in both male and female patients.

Conclusion: The average length of Hamstring Tendons is sufficiently long to be used for the reconstruction of ACL in Khyber Pukhtoonkhwa population of Pakistan.

INTRODUCTION

An anterior cruciate ligament (ACL) rupture is one of the most common knee injuries in sports. It is estimated that the annual incidence is about 1 in 3,000 within the general population in the United States, which translates into more than 150,000 new ACL tears every year[1,2]. It is estimated that approximately 100,000 primary ACL reconstruction surgeries are performed annually in the United States [1,3]. For the reconstruction of ACL the use of hamstring graft has become increasingly famous because of reports of less graft harvest related morbidity and improvement in fixation methods, devices and also the greater morbidity associated with the other grafts[4,5].BPTB auto grafts have been proclaimed as the "gold standard" in ACL reconstruction. Recently, issues relating to donor site morbidity, such as arthrofibrosis, kneeling/patello-femoral pain, and quadriceps weakness, have caused a paradigm shift from 86.9% to 21.2% between 2000 to 2004 to quadrupled semitendinosus and gracilis tendon (QSTG) auto grafts[6,7].According to the biomechanicalstudies the load at which failure occurs in a hamstring graft is proportional to its diameter. . A Waly (2002), study conducted says ACL reconstruction using triple semitendinosus tendon, is a viable technique compared to others [8] . That hamstring auto graft reduces anterior knee pain had already reached statistical significance in 2001 (relative risk 0.49 (95%CI: 0.32-0.76; p = 0.001, I2 = 0%)). The modern endobutton hamstring graft fixation technique yielded similar stability in the Lachman test as bone-patellar tendon-bone grafts, with a relative risk of 1.1 (95%CI: 0.82-1.5; p = 0.6, I2 = 0%)[9]. Vipool K Goradia et al used triple strand hamstring graft in a study and the results showed that 90% of patients can be expected to have a normal or near normal knee at short-to intermediate-term follow-up[10] . In order to assure the optimal 8 cm length and 7 mm thickness of triple strand hamstring graft construct for ACL reconstruction (2 cm in the femoral tunnel, 4 cm intra articular, and 2 cm in the tibial tunnel), it is essential to obtain a minimum tendon length of 24 cm. One of the disadvantages of using hamstring auto graft is the possibility of obtaining a graft of a smaller diameter than optimally required. The surgeon may need to continue with an alternative graft source and fixation technique when such a situation is encountered during surgery. Therefore, preoperative prediction of the sufficiency of the hamstring graft length and thickness for ACL reconstruction would be useful in order to arrange alternative fixation methods or graft choices ready to use at the operation theater.

The world's average height of youth (20–30 years) is 170.6 cm, whereas in Europe, Asia, and India it is 177 cm, 168.8 cm, and 165.3 cm respectively [11].As the average height of Pakistani population is 167 cm and to our knowledge, there is no literature, correlating anthropometric measurements and hamstring graft length (average length) in the Pakistani population, the aim of this study was to determine whether the average length of hamstring grafts (Semi tendinusus and Gracilis) is long enough to be used efficiently for the reconstruction of ACL in Khyber pukhtoonkhwa population of Pakistan.

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MATERIALS AND METHODS

After approval from the ethical committee, we prospectively evaluated 75 (58 males, 17 females) consecutive patients with anterior cruciate ligament (ACL) deficiency who were scheduled for ACL reconstruction using triple strand hamstring graft from June 2013 to June 2016 . Preoperatively anthropometric measurements including age, gender, height and weight were taken. Intraoperative measurement of semitendinosus and gracilis were made, including absolute length and diameter of the triple strand graft using 1 mm calibrated scale. All measurements were obtained after removal of attached muscle by blunt method and fat but before any further postharvest alteration or trimming of the graft.

RESULTS

This study consists of 58 males, 17 females with average age of 30.8 ± 3.7 years. Average height of patients was166.6 ± 2.1, average weight of patients was 69.3 ± 3.-kg . Intraoperative measurement of graft tissue yielded an average semitendinosus tendon length of29.8 ± 1.7 cm and Gracilis graft was 27.2 ± 1.7 cm. The average length of combined final triplet graft was 9.6 ± 67cm.

A summary of the data is presented below.

Gender		Gracilis Length	Semitendinosus Length	Graft Length	Age of patient	Weight of Patient	Height of Patient
	Mean	27.3966	29.9621	9.6431	30.9310	69.4828	166.6034
male	N	58	58	58	58	58	58
	Std. Deviation	1.85377	1.69559	.67489	3.60245	3.13017	2.17594
	Mean	26.9412	29.2941	9.5118	30.7647	69.0588	166.6471
female	N	17	17	17	17	17	17
	Std. Deviation	1.59963	1.72354	.66510	4.50735	3.61370	2.34364
	Mean	27.2933	29.8107	9.6133	30.8933	69.3867	166.6133
Total	N	75	75	75	75	75	75
	Std. Deviation	1.79920	1.71351	.67048	3.79393	3.22529	2.19885

DISCUSSION

Studies have shown an increased incidence of anterior knee pain, arthrofibrosis, and quadriceps weakness associated with use of the bone-patellar tendon-bone auto grafts[12,13].Most of the Western literature showed that height is the best predictor among anthropometric data in hamstring graft size [14,15]. Results of our study showed that average length of semi tendinusus and gracilis are long enough that can be effectively used for reconstruction of ACL in KP population of Pakistan.

The limitations of our study are small sample size, lack of inter-observer readings of graft size.

CONCLUSION

As BPTB grafts are associated with increased morbidity and other complication when used for reconstruction and from the study we conclude that average length of hamstring grafts is long enough to be used for reconstruction inkpk portion of Pakistani population . However validate the observations of our study a well-designed study with a larger sample size in population is required.

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