

**T**EAM-BASED LEARNING (TBL) WAS A TERM first popularised by Michaelsen to describe an educational strategy that he developed for use in academic teaching. TBL is a teacher-directed method that promotes the application of knowledge using small groups in a class. The method increases learner engagement, promotes active learning and is reported as enjoyable by learners.<sup>1-3</sup>

TBL is increasingly being used in medical education.<sup>2,3</sup> The objective of TBL is to go beyond the simple coverage of content and to focus on ensuring that the students practise using course concepts to solve problems. In other words, TBL can be defined as an instructional strategy that is based on techniques for developing high-performance learning teams and that can enhance the quality of student/trainee learning in almost any course.

TBL promotes active learning within a group of students for three reasons. First, group work is central to exposing students to and improving their ability to apply course content. Second, the greater part of class time is used for this group work. Third, TBL involves multiple group tasks that are designed to improve learning and promote the development of self-managed learning groups.

Students involved in TBL learn content in three phases. In phase one, the students complete assignments, such as textbook reference readings, outside of the classroom. The students are responsible for the completion of these assignments. In phase two, student groups meet, as well as taking readiness assurance tests (RATs), first individually (IRAT) and then in assigned small groups (GRAT). In the third phase, the students in the assigned teams consult to solve complex problems, triggering active participation and learning.<sup>4,5</sup>

The benefits of TBL include maximising student engagement, improving teamwork, developing communication skills, enhancing problem-solving skills and promoting knowledge outcomes.<sup>5-9</sup> There are limited studies comparing TBL to other educational methods. These studies are also varied in their methodology as well as their choice of subjects. Despite this, the studies have demonstrated higher engagement and enjoyment among TBL participants. Nevertheless, there are controversial data on whether TBL improves knowledge outcomes compared to other educational techniques.<sup>6,10-12</sup>

Human anatomy is a basic science course in any

physical therapy curriculum. Anatomy teaching has recently seen the introduction of several controversial changes. These include a reduction in course hours, the integration of preclinical and clinical courses, the abolition of cadaver dissection, the introduction of new educational methods, a change in students' learning objectives and a decreased supply and demand for gross anatomy dissectors and instructors.<sup>13</sup> The teaching of anatomy using TBL has received much attention in recent years.<sup>14-16</sup> As an understanding of anatomy is fundamental to the understanding of other subjects in the physical therapy curriculum, especially the anatomy of the limbs and the vertebral column, it has to be learned effectively. In limb anatomy, the anatomy of related bones, muscles, and nerves are taught together. This gives a holistic understanding of the upper and lower limbs of the body and the mutual relationship of the limb structures.<sup>17</sup> The hypothesis of this study was that TBL would be effective for teaching limb anatomy; this would be tested on undergraduate physical therapy students by comparing TBL to a traditional lecture course, measuring knowledge and the students' satisfaction with the outcomes.

## Methods

This study was conducted at the School of Rehabilitation Sciences, Shiraz University of Medical Science, Iran, from February to June 2012. The participants were first-year physical therapy students who voluntarily took part in the study. All the procedures were performed under the supervision of the Ethics Committee of Shiraz University of Medical Sciences, Shiraz, Iran.

The lower limb anatomy instruction programme began in the second semester of the first academic year. Lower limb anatomy serves as the basic anatomy course of the curriculum. In February 2012, 30 students were enrolled in the course. The class met once a week for two hours and the students participated in all class sessions for 16 weeks. The course was divided into six parts: bones, joints, gluteal region, thigh, leg and foot. The same students were taught using traditional lectures and TBL in the first and second eight-week periods of the semester, respectively. Information regarding the dates of the midterm and final examinations, study guides, and textbook references were offered