Letters to the Editor
Platelet-rich plasma versus corticosteroid injection for recalcitrant lateral epicondylitis: clinical and ultrasonographic evaluation

To the Editor:
We read with interest the article by Gautam et al.\(^1\) We suggest that gravitational force (G) rather than revolutions per minute (RPM) is better for describing the relative centrifugal force (RCF). The rotor, regardless of its size, revolves at a rate known as an angular velocity. The force exerted on the contents varies depending on the diameter of the centrifuge: \( RCF \) or \( G = 1.12 \times \text{radius of rotation in mm} \times (\text{RPM}/1000)^2 \)

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Authors’ reply
A centrifuge works on the sedimentation principle, where the centrifugal acceleration causes denser particles to move towards the periphery in the radial direction and lighter particles are displaced towards the centre.\(^1\) Most particles in a liquid suspension eventually settle at the bottom of a container, due to gravity at one particular time, but the time period required for such segregations is impractical. In addition, extremely small particles may not separate at all without high centrifugal force. According to the Stokes law,\(^2\) the sedimentation velocity \( v \) (meter/second) of a particle is given by the equation: \( v = [d^2(\rho_p – \rho_m)g]/18\mu \), Where ‘\( d \)’ is the diameter of the particle, ‘\( \rho_p \)’ is the density of the particle (kg/m\(^3\)), ‘\( \rho_m \)’ is the density of the liquid medium (kg/m\(^3\)), ‘\( \mu \)’ is the viscosity (Pa s), and ‘\( g \)’ is the gravity (m/sec\(^2\)). When a suspension is rotated at a particular speed (i.e. RPM), the centrifugal force guides the particles to move away from the axis of rotation radially. The force on these particles is termed as RCF and is expressed as a multiple of the gravity, making it a dimensionless quantity. For example, an RCF of 500 xg implies that the centrifugal force applied is 500 times greater than the earth’s gravity. In addition, RCF may be given by the equation: \( RCF = r\omega^2/g \), where ‘\( g \)’ is gravity, ‘\( r \)’ is rotational radius, and ‘\( \omega \)’ is angular velocity in radians per unit time. Thus, protocols for centrifugation should specify the amount of acceleration (i.e. RCF) to be applied to the sample, rather than specifying RPM. Understanding of this distinction is important, as 2 rotors with different diameters running at the same rotational speed exert different acceleration to the samples. These mathematical calculations may be
avoided by having a nomogram that can convert RCF to RPM for a rotor of a given radius. A ruler lined up with the radius on one scale and the desired RCF on another scale, will point at the correct RPM from the table. The variation in protocols for segregating platelet-rich plasma may be the reason for samples with different compositions that may, in turn, induce different biological responses.\(^5\) The optimum duration and acceleration for centrifugation and separating platelet-rich plasma remains a topic of debate.

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REFERENCES


Cannulated versus non-cannulated cancellous screw fixation for femoral neck fractures: a synthetic bone biomechanical study

To the Editor:
We read with great interest the article by Gardner et al.\(^1\) The bone model used (Synbone, model number 2022; Malans, Switzerland) could not be found on the company’s website.\(^2\) The polyurethane proximal femur is made of a foam cortical shell and cancellous inner material. It is ideal for large-scale surgical skill courses. However, the fourth-generation Sawbones (model number 3403; Pacific Research Laboratories, Vashon [WA], USA) are more commonly used.\(^3\)–\(^5\) Bone model, as an alternative to human cadaver bone, can provide more reliable experimental and training conditions.

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