

RACQUET STRING TENSION: THE HIDDEN PERFORMANCE MULTIPLIER

Welcome to this comprehensive analysis of how string tension affects your performance across tennis, squash, and badminton. Whether you're looking to optimise your play through technical adjustments or simply understand why the pros string their racquets the way they do, this guide will provide you with the knowledge to make informed decisions about your equipment setup.



UNDERSTANDING STRING TENSION: THE FUNDAMENTALS

WHAT IS STRING TENSION?

String tension refers to the tightness or looseness of the strings within the racquet frame, measured in pounds (lbs) or kilograms (kg). It represents the pulling force applied to the strings during the stringing process. Typical ranges vary by sport:

- Tennis: 40-65 lbs (18-30 kg)
- Squash: 25-35 lbs (11-16 kg)
- Badminton: 18-24 lbs (8-11 kg)

THE PHYSICS BEHIND TENSION

The relationship between string tension and performance is governed by the principle of energy storage and return. When a ball or shuttle makes contact with the string bed, the strings deform and store energy, which is then returned to propel the projectile forward.

Lower tensions allow more string deformation (trampoline effect), whilst higher tensions create a stiffer, more controlled hitting surface. The string bed's response is further influenced by the string material, gauge (thickness), and pattern.

TENSION EFFECTS ACROSS RACQUET SPORTS

SPORT-SPECIFIC CONSIDERATIONS

Whilst the underlying physics remains constant, each racquet sport demands different tension configurations due to variations in equipment, playing environment, and competitive requirements. Understanding these sport-specific nuances is crucial for optimising your setup.

Additionally, playing style and physical attributes (strength, technique) significantly influence the ideal tension. A defensive player might benefit from different tension settings compared to an aggressive attacker, even within the same sport.

The consistency of tension is also worth noting—strings naturally lose 10-15% of their tension within 24 hours of stringing (called tension loss), with further gradual decreases over time. Professional players often have fresh strings installed before each match to maintain consistent performance.

TENNIS

1

Played with a relatively heavy ball (56-59.4g) requiring substantial power. Court size necessitates control and spin generation. Modern game increasingly emphasises topspin, influencing tension choices.

BADMINTON

3

Uses lightweight shuttlecock (4.8-5.5g) with unique aerodynamics. Extremely fast sport requiring explosive power and delicate touch. Employs the lowest tensions of the three sports due to the light weight of the shuttlecock.

2

SQUASH

Faster game with lighter ball (24g) in enclosed space. Requires quick reaction and precise control. Players need both power for drives and touch for drop shots. Typically uses lower tensions than tennis.

TENNIS STRING TENSION ANALYSIS

1

LOW TENSION (40-48 LBS)

Power: Maximum power generation due to enhanced trampoline effect; strings deform more and return more energy to the ball

Feel: Greater ball pocketing and sensation of the ball staying on strings longer

Spin: Moderate spin potential; strings grab the ball well but may not provide enough stability

Ideal for: Players with shorter swings, those recovering from arm injuries, or those seeking additional power

2

MEDIUM TENSION (48-55 LBS)

Power: Balanced power output with good energy return while maintaining control

Feel: Good combination of feedback and comfort; widely preferred by club players

Spin: Solid spin generation; strings can both deform and snap back effectively

Ideal for: All-court players seeking versatility and balance between power and control

3

HIGH TENSION (55-65 LBS)

Power: Reduced power as stiffer strings return less energy; player must generate more of their own pace

Feel: Enhanced precision and feedback; greater accuracy for placement

Spin: Maximum spin potential; strings bite into the ball better and snapback is more pronounced

Ideal for: Advanced players with full swings who generate their own pace and prioritise control

Professional players like Rafael Nadal (55-57 lbs) and Roger Federer (historically 48-50 lbs) demonstrate how tension preferences vary even at the highest level of the game, influenced by playing style and technical approach.

SQUASH & BADMINTON STRING TENSION INSIGHTS

SQUASH STRING TENSION

LOW TENSION (23-26 LBS)

- Maximum power generation and sweet spot size
- Enhanced feel for touch shots like drops and boasts
- Reduced control for precise placement shots
- Typically used by recreational players or power hitters

HIGH TENSION (27-35 LBS)

- Superior control and shot precision
- Reduced vibration and more direct feedback
- Smaller sweet spot requiring better technique
- Preferred by professional players and control specialists
- Places more strain on the racquet frame

Elite players like Mohamed ElShorbagy typically use tensions around 28-30 lbs to balance power with the precise control needed at professional level.

BADMINTON STRING TENSION

LOW TENSION (18-20 LBS)

- Greater durability and string longevity
- Enhanced power for beginners with developing technique
- More forgiving on off-centre hits
- Less precise control for net play and drop shots

HIGH TENSION (21-24+ LBS)

- Superior shuttle control and placement precision
- Enhanced repulsion effect for faster shuttle speeds
- Better feel for delicate net exchanges
- Increased risk of string breakage
- Requires higher quality racquet frames that can withstand tension

Olympic champions like Viktor Axelsen often use extremely high tensions (26-28 lbs) with specially reinforced racquets to maximise control and shuttle speed at the elite level.

STRING MATERIALS AND THEIR IMPACT ON PERFORMANCE



NATURAL GUT

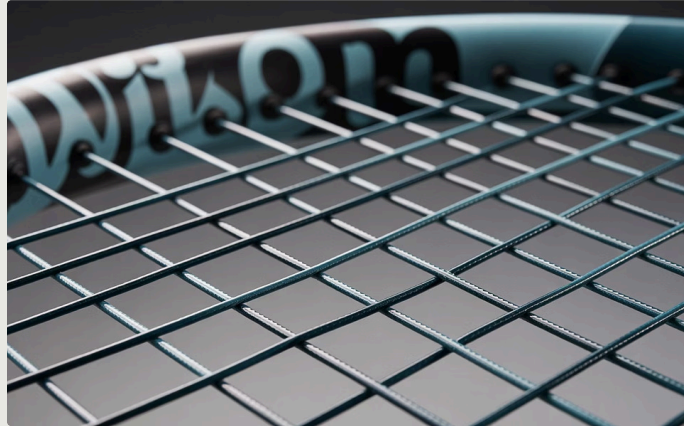
Tension Characteristics: Exceptional tension maintenance; loses only 5-10% over time

Feel: Superior feel and comfort with unique elasticity

Performance: Provides both power and control simultaneously

Drawbacks: Expensive, moisture-sensitive, less durable

Ideal Tension: Often strung 1-2 lbs higher than synthetics due to natural elasticity



POLYESTER

Tension Characteristics: High tension loss (15-20%); deadens quickly

Feel: Stiff with less vibration dampening; potentially arm-unfriendly

Performance: Superior spin generation and control; reduced power

Drawbacks: Harsh feel, tension loss, requires player-generated power

Ideal Tension: Often strung 2-4 lbs lower than recommended to compensate for stiffness



MULTIFILAMENT

Tension Characteristics: Moderate tension maintenance; better than polyester

Feel: Comfortable with good shock absorption

Performance: Good all-around performance; balance of power and control

Drawbacks: Less durable than polyester, less powerful than gut

Ideal Tension: Versatile range; typically strung at manufacturer recommendation

HYBRID STRINGING: THE BEST OF BOTH WORLDS

Many players opt for hybrid setups—different string types for mains (vertical) and crosses (horizontal). Common combinations include polyester mains with multifilament crosses to balance control and comfort. This approach allows for customisation based on playing style and preferences whilst mitigating the drawbacks of any single string type.

OPTIMISING STRING TENSION FOR YOUR GAME

MATCHING TENSION TO PLAYING STYLE AND PHYSICAL ATTRIBUTES

POWER BASELINE PLAYERS

If you rely on heavy groundstrokes and topspin to dominate rallies, consider:

- Tennis: 52-60 lbs with polyester strings for spin control
- Squash: 27-32 lbs to harness your natural power
- Badminton: 21-23 lbs to maintain control on powerful clears and smashes

TOUCH/FINESSE PLAYERS

If your game relies on variety, angles, and court craft:

- Tennis: 48-54 lbs with natural gut or multifilament for feel
- Squash: 25-28 lbs to enhance feel for drops and deception
- Badminton: 20-22 lbs for better feel at the net and delicate shots

ALL-COURT/VERSATILE PLAYERS

If you employ a balanced approach with varied shot selection:

- Tennis: 50-55 lbs with hybrid stringing
- Squash: 26-29 lbs for balance between power and control
- Badminton: 20-23 lbs with balanced string choice

PHYSICAL CONSIDERATIONS

- **Arm Issues:** If you experience tennis elbow or arm discomfort, consider lower tensions (3-5 lbs below normal) and more elastic strings
- **Strength Level:** Stronger players can generally handle higher tensions more effectively
- **Technique:** Players with proper technique can benefit more from higher tensions, whilst developing players might benefit from lower tensions

TESTING METHODOLOGY

To find your optimal tension:

1. Start with manufacturer's recommended mid-range tension
2. Play several sessions, noting power, control, and comfort
3. Adjust by 2 lbs increments until finding the sweet spot
4. Consider seasonal adjustments: tighter in summer when balls/shuttles play faster, looser in winter

KEY TAKEAWAYS & RECOMMENDATIONS

1 TENSION IS ALWAYS A COMPROMISE

There is no perfect tension—only the right tension for your particular needs. The eternal triangle of power, control, and comfort means optimising for one aspect typically reduces another. Your ideal tension will balance these factors based on your physical attributes, playing style, and personal preferences.

3 REGULAR RESTRINGING IS ESSENTIAL

Even without breaking, strings lose tension and playability over time. For optimal performance, restring as often as you play per week (e.g., playing twice weekly = restring every 6 months). Professional players restring before every match to maintain consistent performance.

2 STRING TYPE MATTERS AS MUCH AS TENSION

The material properties of your strings interact with tension to determine performance. A soft multifilament at 55 lbs may play more comfortably than a stiff polyester at 50 lbs. Consider both aspects together rather than focusing solely on numbers.

4 EXPERIMENT SYSTEMATICALLY

Keep a string journal noting tension, string type, conditions, and performance feedback. Small adjustments of 1-2 lbs can make significant differences in feel and performance. Try different combinations during practice before implementing changes in competition.

NEXT STEPS FOR OPTIMISATION

Consider consulting a professional stringer who specialises in your sport. Many offer demo services allowing you to test different string and tension combinations before committing. Remember that string tension is just one component of your equipment setup—racquet weight, balance, and swing weight all interact with tension to create your overall playing experience.