



## **PREVENTION OF INJURIES AND HOW TO GET YOUR GYMNAST OR ACROBAT BACK FROM INJURY FASTER**

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There are several areas of knowledge that will help the health professional, coach, parent and athlete properly prevent, treat and rehabilitate gymnastic and acrobatic injuries. We will:

1. review athletic injuries and some general rules that apply to them,
2. discuss the types of injured athletes and how to avoid or reduce problems dealing with them,
3. understand the basics of diagnostic testing and various forms of treatment,
4. realize the differences in health care providers and identify the best care available,
5. study type of injury and how it affects treatment, skill restrictions and return to practice or competition

### **Treating Acute and Chronic Athletic Injuries**

**Anatomy of an Injury:** Every injury has a fairly predictable mechanism of injury and pattern of signs and symptoms. The athlete or patient will tell you what the problem is if you stop long enough to listen. Physical exam is to confirm what you already suspect. If your athlete's doctor has no idea after history and exam...see a sports medicine doctor for a second opinion. There are several common parts that make up the "anatomy" of athletic injury:

All orthopaedic problems have to do with one of the following:

- Anatomical or Mechanical problems- something is torn, broken or altered
- Flexibility and Imbalance- a lack of flexibility or muscle imbalance
- Strength and Endurance- muscle strength and strength over time or at end of practice

All orthopaedic diagnosis has to do with figuring out which of these is affected

All orthopaedic treatment and rehabilitation has to do with restoring or approaching normal anatomy, flexibility, , balance, strength and endurance

### **Acute Injury:**

Acute injuries "just happened" and result from a fall, twist, slip or bad landing

Acute injuries are things like ankle sprains, fractures, dislocations, ligament tears (ACL), muscle pulls or strains, cuts or lacerations, bruises or contusions

Acute injuries can be reduced through proper conditioning, technique, safety and spotting

### **Chronic Injury:**

Chronic injuries happen over time and result from overuse, over-training, lack of recovery time and the coach or athlete ignoring the warning signs

Chronic injuries are things like shin splints, patellar, Achilles or rotator cuff tendonitis, tennis elbow, bursitis, atrophy and stress fractures

Chronic injuries can be reduced through cross-training, planned recovery time, and recognizing the signs of overuse early in the process

## Some General Rules

**General Rules:** There are general rules that apply to most athletic injuries.

***Injuries happen!*** - If an athlete competes in any sport at a high level, injuries are a part of it. The key is learning how to manage it to the benefit of the athlete's health, safety and competitive opportunity.

***Injury Incidence-*** The medical literature has shown in gymnastics and most other sports that they are more common in practice, but happen at a higher rate in competition. The definition of injury is vastly different across studies and sports. In gymnastics, an injury is often defined as one that causes "lost time in the gym". An ankle sprain in a gymnast might prevent practice for a week or more but in another sport the athlete might be able to be taped and return right away. This leads to a relatively high incidence of injury in gymnastics and gives one the false impression that our sport is "unsafe". The facts show that the overwhelming majority of gymnastic injuries are minor and have a quick recovery.

***Risks and benefits of Early Return-*** Some injuries can have a degree of risk of more serious injury and legal liability if the athlete is returned to the gym too soon or without proper rehabilitation. This is balanced by the fact that early return to some activity is beneficial both physiologically and psychologically. The coach, athlete and doctor need to have a unified and clear plan for return that maximizes this benefit and lessens the risk.

***Recognize the Type of Athlete-*** We treat a wide variety of athletes in gymnastics from recreational to world-class, very young to older adults, self-motivated to apathetic, compliant to non-compliant, and even some who don't have an injury at all, but other non-physical issues.

**Rules of Life in Sports Medicine:** There are many truths that sports medicine professionals have learned over time that often guide us, here are but a few:

***It's not who you get better; it's who you get back!*** - It is easier to get someone better physically than it is to get them back to their sport, especially at the same level. The medical literature shows that returning an elite athlete back to the pre-injury level is difficult with moderate to severe injuries because it requires complete physical restoration and a coordinated effort between athlete, doctor, physio-therapist and coach.

***Remember, you may not have seen it, but that doesn't mean it hasn't seen you!*** A professor of mine asked a group of new doctors if they had seen a particular knee condition and one doctor said that he had never seen it! The professor replied that he had in fact seen it, but he had not recognized what it was. We all need to get better at our diagnostic skills so that we don't miss diagnoses that we are not seeing often and to know when we need help from an expert .

***There is anything that you can't make worse by operating on it!*** Physicians take an oath to "do no harm". We must be sure that our surgical treatment, injection or therapy won't make the athlete worse. It should usually be preceded by conservative or non-operative treatment that failed, then invasive treatment might be worth the risk.

***Assume nothing, trust no one, check everything yourself!*** It is appropriate to trust your health professional if you are an athlete or radiology colleague who is reading the MRI if you are a doctor. This general rule reminds us to question even the best of us because we all can make an error or miss something. I have seen hundreds of problems that were missed by the MRI or were present on the MRI but missed or minimized by the doctor reading the study, hence I read the report and look at the films!

## Types of Injured Athletes

**Athletes aren't "Normal" People!** There are some differences between most athletes and others that can either be an advantage, a disadvantage or a challenge.

The first difference is that they are generally so much stronger (muscles, ligaments, tendons, vascular supply) before the injury so should heal faster than "normal" people.

The second difference is that the athlete's performance requirements are often greater than "normal" people so the endpoint for therapy may be at a much higher level.

Third, most athletes can't miss too much time from practice and competition or the season or competitive year is over. This is especially important as prolonged immobilization or non-weight bearing after an injury can lead to muscle atrophy and triple their recovery time.

Hence, athletes require rapid diagnosis, early treatment, earlier motion and weight bearing, optimized nutrition, early physio-therapy, chiropractic, MRI, surgery and rehabilitation

**Types of Athletes:** Athletes come in different shapes and sizes and most are easy to manage, but there are some that can present non-medical challenges to the health care professional.

*Athlete 1: Never Hurt*– These athletes have a long history of hard work, are safety and technique conscious, have few previous injuries and really don't want to be bothered by injury. They are injured rarely and easy to manage.

*Athlete 2: Fallen Angel* – Their acute injury is usually a fall, hit, cut, twist or "accident". They get early triage and treatment at the gym for minor injuries or at the emergency room or the doctor's office for moderate or major injuries. They are more likely to use a sports medicine professional. Solving safety issues and complete rehabilitation before return can prevent a re-injury or a new injury.

*Athlete 3: Angel To Be*– They are similar to Athlete 2 as they are temporarily injured. The difference is that they may lose their confidence easier and therefore never return to their same level of competition unless you are proactive. As with Athlete 2, an early return to practice is helpful physiologically and psychologically. Early motion and therapy reduces time missed and return to full practice. Encourage coaches to create or modify a training program that is within their limitations during recovery. Be patient and restart progressions to get them back to their level. If they are healed physically but can't seem to return, consult a sports psychologist.

*Athlete 4: Too Much Work or I'm Still Hurt*– Chronic or overuse injuries have similar symptoms like aching, fatigue, pain with use, often with no specific trauma and usually as a result of repetitive trauma. It commonly affects bones as stress fractures and tendons as slow tears. Common areas in gymnasts include the tibia, foot, Achilles, rotator cuff and patellar tendon. The key is to stop the cause, shift to lighter workout, change technique, decrease repetitions and give rest days. Most respond to NSAIDs, physio-therapy, chiropractic & other non-surgical care.

*Athlete 5: Doesn't Add Up*: There is an odd mechanism of injury, pain is out of proportion or doesn't fit with other's description of the injury. They might have a history of multiple previous injuries; maybe they haven't been with the team long. In some, there may be no objective findings or their findings "don't make sense" ; there may be other issues behind the "injury". This may not be something you can figure out or fix so the best approach is to be nice, give them a way to leave the gym if they want and let them go or they affect the other athletes.

*Athlete 6: Law Suit or Trouble*: Preserve, photograph and document any injury including the site, circumstances, safety equipment and get written statements from your staff. If this is all done before they have a lawyer, you are on much firmer ground. Educate your coaches, trainers and staff on safety and risk management to prevent this or limit your liability if something happens. Be nice, be professional and be objective. Learn to recognize potential problem athletes before they occur and gracefully get them out of your gym.

## How to Avoid and Reduce Problems

### **Prevention is the best!**

Reduce **Acute Injuries** with common sense and safety awareness:

- Follow proper skill progression order
- Use the right kind of spot and spotter
- Create a safe environment at practice and competition
- Know when to use mats, belts, pits and trampolines
- Eliminate “goofing around” or rough play
- Don't try to work when athletes too fatigued or sweaty
- Teach athletes to report any injury early
- Speak to older coaches about prevention strategies they use

Reduce **Chronic Injuries** with common sense and program design:

- Cross-train with low impact or low weight work (elliptical, EFX, biking, swimming, weights)
- Pre-season conditioning- low weight, high repetition, avoid fatigue, discipline specific
- Logical training allowing muscle recovery and some time off between seasons
- Create an environment that encourages early reporting of injuries for early treatment
- Teach coaches to be aware of signs of chronic and overuse injuries
- Use acute injury prevention strategies to prevent chronic ones
- Reduce “wear and tear” repetition

### **Be Careful!**

These athletes can give you headaches, worry and potential for legal problems

- History of excessive previous injuries
- Recurrent shoulder or kneecap dislocations
- Low back injuries/ Ruptured disc
- Neck injury/ Cervical Stenosis (narrow spinal cord area)
- Multiple previous stress fractures
- Only one of a paired organ (kidneys, eyes, testicles)
- Eating Disorders: Anorexia or Bulimia
- “Leap before they look” athletes

### **The 80/20 Rule**

Remember that in most gyms, you spend 20% of your time taking care of 80% of your athletes and 80% of your time taking care of the other 20%. The 20% is usually in three categories: 1) higher level or elite athletes, 2) injured athletes, and 3) problem athletes. The trick is to minimize categories 2 and 3 by developing a strategy to deal with each. The strategy for dealing with injury is to plan prevention and injury/ rehabilitation management. The key for dealing with problem athletes is get plenty of help from others, sports doctors, spine specialists, psychologists, nutritionists and others.

### Basics of Diagnostics Tests and Treatment

**Why doctors do diagnostic tests:** Like X-rays, Lab Work, Bone Scans, CT Scans, MRI

- To differentiate between possible diagnoses because the treatment is different (rehabilitation versus surgery)
- When a delay in diagnosis can cause significant harm or liability (tumors, infection, head/neck)
- You need to make a quick diagnosis because minimizing lost time is critical to this season and possibly next competitive season (fracture, ACL, shoulder)
- You have no earthly idea what is going on!

### **X-Rays Made Simple**

Regular X-Rays: Show bone well and can usually detect fractures, assess healing and can see obvious tumors {*SOME RADIATION+*}

CT or CAT Scans: X-Ray with computer manipulation shows bone very well and gives almost a 3-D picture, much more sensitive for detecting fractures, assess healing and detailing bone tumors {*MORE RADIATION++*}

Bone Scans: A medicine is injected in your vein and a detector is used over the next few hours to see where it concentrates or pools, good for detecting infections, tumors and stress fractures (including healing) {*SOME RADIATION+*}

Bone Density Test: May be a CT scan or a type called a DEXA scan, checks for thin bone (osteoporosis), may be used in a thin female gymnast who has infrequent periods and more than one fracture {*DEXA-SOME RADIATION+, CT-MORE RADIATION++*}

MRI: Uses a powerful magnet to line up the hydrogen (mostly as H<sub>2</sub>O) in your body. It gives off a signal the computer detects. More water means a bright white signal (like in blood, joints, fat), less water is gray (like in muscle, bone marrow) or minimal water is black (like in bone, cartilage, tendons & ligaments). It gives a 3-D picture like CT Scans but better. We find problems by looking for water signal where it shouldn't be (white signal in the middle of a ligament or cartilage is abnormal) {*NO RADIATION*}

### **Terrific Tidbits of Treatment**

Early motion is good, immobilization is bad; unless obligatory initial healing time needed

Any surgical technique that respects or restores normal anatomy or physiology is GOOD

Arthroscopic procedures are generally less invasive, have fewer complications, shorter rehabilitation and faster return to work or sport. This assumes that the arthroscopic technique is as good or better than open surgery

Tourniquets can be BAD, minimize blood loss but at a price...30% quadriceps atrophy after just one hour of use. This can significantly delay recovery and return.

### **Best Care Providers**

#### **Not All Therapists are the Same!**

Charge generators- they do treatments that may not be effective but generate charges or fees

Cookbook- they do the same thing for similar problems every time without regard for differences in injuries, athletes or sport

Shuffleboard- these therapists shuffle you around to assistants, tech of other therapists with misses the benefit of continuity of care

Good Therapists- they do an admirable job but are not the best for athlete's needs

Gifted Therapists- take own history, examine and draw conclusions, design person and diagnosis specific programs, can make ongoing adjustments

Gifted Sports Therapists- Heaven On Earth! They are gifted therapists who also understand the sport and assist with progressions

#### **Not All Doctors are the Same! This could be a M.D., D.O., D.C. or D.P.T.!**

NSAIDs for all: All you get are pills or office visits

Hammer Only: Every problem is not a nail

Cut and Run: They operate early and often

Lost but well-meaning: I know nothing! No clue about athletic injuries...

I Don't Care: Like Clark Gable in "Gone with the Wind"

The Ideal Doctor: They listen, they care, they work with you, they teach you...

Best Results are with a Sports Medicine professional

## **What Should Be Done**

Look at and read all x-rays, MRI, and tests. Don't just depend on reports.

Read all previous doctors notes and operation reports for what they say and don't say

Scan therapy reports or quiz the patient on treatment given, they may not have had effective or comprehensive program

Have patient demonstrate their home exercise program (can they remember, technique, content). If they can't remember, they are probably not compliant

Expand history especially in mechanism (how it happened), symptoms and previous injury

Actually examine the patient!

Explain the likely possible problems, and why one diagnosis is more likely

Show them the problem until they believe it, demonstrating weakness is very convincing

Help them understand the treatment plan and their role in it

Tell them what's expected of them and they usually do it

## **What is Reasonable Treatment?** How can the coach help their athlete...

Coaches can help athletes get good care

Develop a relationship with a Sports Medicine Professional (M.D., D.C., P.T., A.T.C.)

Try to direct your athletes to these providers

Don't assume the provider's recommendation is the ONLY option, especially if they don't work with athletes

Expect more aggressive treatment for your high level athlete and slower for recreational

If possible, go with the athlete to the initial visit

Ask lots of questions; if the provider doesn't like to give answers, find another provider

Question the following: prolonged immobilization or casts, no obvious rehabilitation or treatment plan, any kind of surgery or long time for return to gym

If there are still questions, get a second opinion from a Sports Medicine Professional

If it still doesn't make sense: contact a member of your national medical team for advice

## **Return to the Practice and Competition**

### **How Does Type of Injury Affect:** Treatment and return to the gym depends on

Whether the injury is acute or chronic

Severity of the injury

Skills that need to be worked

Time of year in relation to competition

Response to treatment, athlete compliance

Early treatment, motion and rehab

Understand skill restrictions

### **What are skill restrictions?**

Scaling back the training program to fit the injured athlete, like "light duty" for an injured worker.

Find someone who can help guide you in how to limit and when to advance your injured athlete.

Think of injuries in four broad categories: minor acute, moderate acute, severe acute and overuse; each categories are similar with respect to treatment, skill restrictions required and return to competition

### **Skill Restrictions: Lower Body Examples:** One or more might apply-

Avoid skills that cause fatigue or sharp pain

Avoid high impact activities

Increase spotting for landings or dismounts

Avoid twisting tumbling passes

Avoid vault or tumbling on beam (artistic)

Avoid dynamic skills or slides to split (acro)

**Skill Restrictions: Upper Body Examples:** One or more might apply-

- Avoid skills that cause fatigue or sharp pain
- Avoid high impact activities on arms
- Increase spotting for releases/recatch skills
- Avoid tumbling, vault and “giants” (artistic)
- Avoid dynamic, tumbling and hand to hand (acro)
- Avoid tumbling (T&T), tumbling and clubs (rhythmic)

**Skill Restrictions by Category: *Minor Acute Injuries***

*Types of Injuries:* Minor sprains, strains, cuts and contusions; minimal alteration in flexibility, strength and endurance

*Treatment:* Responds well to rest, ice, compression and elevation, ibuprofen, may need braces, taping or supports

*Skill Restrictions:* Minimal

*Interference with Competition:* Little or none

**Skill Restrictions by Category: *Moderate Acute Injuries***

*Types of Injuries:* Moderate sprains, strains, cuts and contusions; minor fractures, dislocations or nerve injuries; moderate alteration in anatomy, flexibility, strength and endurance

*Treatment:* Initially treat with rest, ice, compression and elevation, ibuprofen, may need braces, taping or supports; needs to see provider, home exercise program and probably rehabilitation: surgery or MRI depends on progress

*Skill Restrictions:* Miss a week or two then return with moderate restrictions, may keep them off certain skills, routines or apparatuses; gym work progresses as they hit rehabilitation milestones

*Interference with Competition:* Figure lost time from gym, plus time with skill restrictions, plus time to get back to pre-injury performance level, usually 3-6 weeks total before competition

**Skill Restrictions by Category: *Severe Acute Injuries***

*Types of Injuries:* Severe sprains, strains, cuts, contusions, fractures, dislocations, ligament and cartilage tears or nerve injuries; severe alteration in anatomy, flexibility, strength and endurance

*Treatment:* Needs Emergency Room or provider visit; still treat with rest, ice, compression and elevation, ibuprofen, pain medicine or muscle relaxants; extensive healing time, may need surgery, will need extensive rehabilitation; often needs braces, taping and supports

*Skill Restrictions:* Miss weeks to months before return with significant restrictions, will keep them off certain skills, routines or apparatuses; gym work progresses as they hit rehabilitation milestones; usually some restrictions for 1-6 months

*Interference with Competition:* Figure lost time from gym plus time with skill restrictions plus time to get back to pre-injury performance level, usually 2-9 months total before competition

**Skill Restrictions by Category: *Chronic or Overuse Injuries***

*Types of Injuries:* Patellar, Achilles or rotator cuff tendonitis, shoulder subluxation, Ilio-tibial (IT) band syndrome, Osgood-Schlatter's, bursitis, shin splints, plantar fasciitis, stress fractures; mild/moderate alterations in flexibility, strength and endurance, adjacent joints try to compensate and get involved (fatigue)

*Treatment:* Responds to “relative rest” from the cause, rehabilitation with low weight, high repetition exercise program; counsel them not to work through sharp pain or fatigue (or they reinjure or prolong recovery); ice and/or heat, ibuprofen, may need braces, taping, supports, casts, boots, stimulators or surgery

*Skill Restrictions:* Temporarily avoid skills that cause sharp pain or fatigue of involved area; shorten practice length and number of repetitions, vary the type of work in the gym more often than usual, stop any activity if it causes sharp pain or fatigue

*Interference with Competition:* Little or none unless pain is severe or a stress fracture, minimize practice time to “save them” for competition, most are limited 4-6 weeks, stress fractures can take 2-4 months to heal

### **In Summary**

Remember:

Prevention and Safety Awareness is Critical

Learning Injury Management Basics helps you know when treatment “Doesn’t Make Sense”

Good Providers aren’t afraid of Questions

Establish a Relationship with a Sports Medicine Doctor, Chiropractic Doctor, Therapist or Trainer and your Athlete Injury Management is Easier

Use your National Federation’s Sports Medicine Team and the educational resources available from the FIG Medical Commission