Spatial Awareness Quotient (SAQ) TEST

For

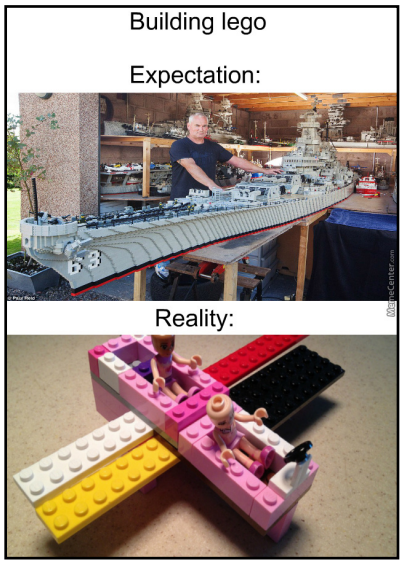
Coaches And Athletes

Freestyle Trampoline Association

www.FreestyleTrampolineAssociation.com

Spatial Awareness Quotient ~ SAQ

I developed this test as a way to practically measure athletic development. It is meant to be a fun drill that gives practical results for the athlete, coach and gym owner. As it is currently substantiated, trampoline *(and the greater acrobatic community)* does not have a test that can be performed on athletes that will obtain any kind of objective measure of their ability to **learn new skills** with previous prerequisites.



This lack of quantifying athletic ability in acrobatics seems to be a long standing issue. Currently, success in the industry is based on accumulation of points, awards and skills over time but has failed to quantify the athletes capability to actually learn the skill on his or her own. With the development of the Freestyle based disciplines such as Parkour and Freestyle Trampoline, athletes are taking skills into their own hands and therefore we must take action and determine key indicators of developmental success outside of the competition realm. Simply put, we need to know if athletes have a proper grasp of how to build skills safely without needing to await the instructions of their coach.

Since acrobats base their success on competition standards there is currently no data that determines how well equipped an athlete is on their own to learn certain skills along the path of the 5.370415×10^{293} 'marker boys.' But, how does any athlete know if they are ready for a skill? If they have chosen not to utilize the expertise of a coach, then what markers do they have to determine their success without a competition structure? Moreover, even competitive athletes seem to have little ability to actually understand the underlying education process that is used to build the skills appropriately without a coach present, providing most if not all of the answers. I have gone to gyms, both Traditional and Freestyle, witnessing a general lack of understanding. There is a video on the FTA that shows this concept in practice and shows the way we tested the athletes:

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The current literature on gymnastics covers a wide spectrum of education in the form of certain bio-mechanical techniques. However, it makes very little, if any headway in measuring how prepared an athlete is to perform a new skill that is not currently in their repertoire or their coaches handbook. The SAQ will simply outline how to test an athlete's *"know-how"* of acrobatics on trampoline. This test measures how much an athlete truly understands acrobatics and how to build skills on their own without the guidance of a coach.

Don't get me wrong, I believe a coach is still a benefit to an athlete without doubt. However, in this day and age with athletes choosing to go it alone, I believe this test will give coaches and independent athletes a measurement that determines really how much they understand the building process. This will directly correlate to how successful that athlete will be in creating new skills, in the future, in a safe manner.

The SAQ does not measure what an athlete CAN do.

It measures how well they can LEARN new skills they CAN'T do.

What is the SAQ?

The SAQ is a calculation for what I believe is the best way to quantify the athletes ability to *actually learn* a new skill. The Rotational Possibilities *(RPF)* formula describes theoretical possibilities, while the SAQ describes how well the athlete can navigate the possibilities.

We see there are infinite options when doing acrobatics, so this formula is again, a *theoretical* spatial awareness calculation. People tend to classify the world's best acrobat as the athlete who *"wins the most medals,"* generally speaking. The issue with that assumption is they tend to repeat the same pattern over and over again, not truly demonstrating they *actually* understand the underlying pathway of learning new skills. They know *how* to follow instructions, not *why* they are following instructions. There is a big difference between following instructions and predicting future outcomes, not yet defined, in a safe manner.

Athletes could repeat the same skills over and over but when they need to understand the principals of rotation and athletic development in such a way that would allow them to do new skills there seems to be a stumbling block within the greater community. They tend to struggle and never attempt it in the first place and if there is no coach present they either back away in fear or the probability of *"huck and chuck"* increases. Due to a lack of knowledge of *how* to build the rotational patterns, many athletes and coaches would either have injuries; falsely thinking they already understand the mechanics when they do not *(ie. telling the athlete to "drop the arm")* or give up, claiming the skill is not safe, rather then aiming to understand how to 'build' the skill.

The word *"Spatial"* makes it sound like this test will provide a measurement of how well the athlete can move in the air but it really measures an athlete's ability to understand how to *build* rotational patterns in their mind without guidance from the coach. From what I see at my clinics, athletes do not know how to *build* rotational patterns. They only know how to *repeat the same* patterns they were taught by their coach. They mimic acrobatics but do not really understand it.

Coaches can use this test to actually measure how well they teach their athletes in a sense. If a coach's athletes all score low it means the athletes do not really understand *how to build* the proper skills. This would indicate the athletes are just waiting on instructions because the coach did not teach them *how* to apply their previous teachings onto new skills along the acrobatic path. A low SAQ score across the board would indicate ineffective coaching patterns and can lead to a *"huck and chuck" mentality of just 'going for it'* rather than building up the skills. It *"takes two to tango"* as they say, so this test does not

aim to blame the coach or athlete specifically. It indicates how correctly the athlete is able to utilize the information from the coach one way or another.

Once an athlete passes all the levels and understands how to build, they can self-administer this test as a ‘game’ with other athletes. I believe this test clearly shows the athletes if they really understand the underlying path their ship is on and would indicate that the athletes who score high would be at a reduced risk of injury for new complex skills. Scoring high on this test would indicate the athlete can safely build skills on their own in the future, which would correlate directly to safety and proper information being transmitted from their coach.

Step 1:

Print off these words or recreate it on your own, separate each word and cut into individual squares.

1.	**SEAT DROP**	**STOMACH DROP**	**BACK DROP**	**ONE LEG BENT**
	LAZY BOY	**STRADDLE**	**FROG LEGS**	**(Invent Your Own)**
2.	**1/4**	**1/2**	**3/4**	**4/4**
3.	**LEFT**	**RIGHT**		
4.	**FORWARD**	**BACKWARD**		
5.	**SEAT DROP**	**PIKE**	**TUCK**	**STRAIGHT**
	LAZY BOY	**STRADDLE**	**FROG LEGS**	**(Make Your Own)**

Step 2:

Separate them into the categories as shown below *(depending on the level).*

1. ***TAKE-OFF POSITION***
2. ***DEGREES OF ROTATION***
3. ***ROTATION AXIS*** ***- Left or Right Twist***
   - Forward or Backward Flip
5. ***POSITION IN THE AIR BEFORE LANDING***

Step 3:

Put each of the squares of each category into their own pile and shuffle them up face down *(or put in a bowl/jar).*

Step 4:

Pick out one of each category at random which would give each aspect of a NEW skill to create.

Step 5:

Let the athletes create the skill without help that they randomly picked *(please supervise them during this stage);*

The Athlete will have 4-6 pieces of Paper *(depending on level)* **that when put together will create a skill:**

Take-off Position + Degrees of Rotation + Direction of Rotation + Position in the Air = Skill To Solve

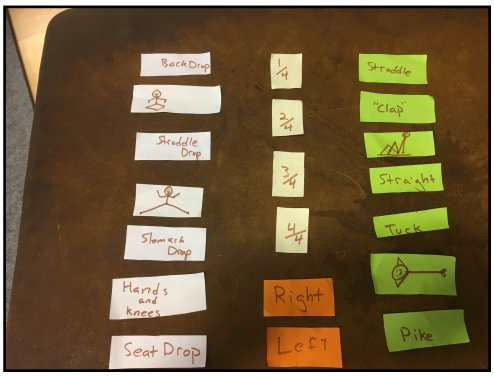
For Example:

In the picture here**,** the athlete has chosen to try to learn a skill that begins with a **Seat Drop, 1/2 turn** to the **Left** with a **Tuck Position**, performed at any time during the skill before they land on their feet.

Note: *Not all skills will land on their feet!*

BEGINNER LEVEL:

This version of the test is for new or younger athletes and only picks **one axis** to rotate on. As a coach it is easier to have new jumpers focus on twisting, so the degrees of rotation will be on the twisting axis, not the flipping axis *(yet).* The athlete will simply combine the picked slots of paper at random and create a *"skill"* that they have to accomplish as part of the test/game. Coaches and athletes will need to cut out each of the below 'elements' and scramble them in a bowl or jar to be picked randomly. Coaches or athletes can simply write down each element below and write the element on the paper. They need to combine the Take-off Possibility *(TOP)* with the Degree of Twists *(DOT_1)* with the Direction of Twist *(DOT_2)* with a Position *(P).*



$TOP + DOF_1 + DOT_2 + P = Skill\ To\ Solve$

TAKE-OFF POSITION *(TOP)*	DEGREES OF TWISTS *(DOT_1)*	DIRECTION OF TWIST *(DOT_2)*	POSITION (P)
SEAT DROP	1/4	LEFT	TUCK
BACKDROP	2/4 *(HALF TURN)*	RIGHT	PIKE
STOMACH DROP	3/4		STRADDLE
HANDS & KNEES DROP	4/4 *(FULL TWIST)*		STRAIGHT
STRADDLE SEAT DROP (SPLITS)			

As you can see, you will be able to test how well the athlete can be given a *"skill to solve"* and based on how well they understand the mechanics they will be able to build these skills degree-by-degree *(marker boy-by-marker boy)*. I suggest the coaches do this with their athletes at first to ensure that they are safe. It is more of a drill at the start with the younger ones who won't really understand how to build skills yet. This test will help them do that in a quantifiable way.

Notice how certain combinations will require unique landing positions such as a sideways landing? This is where the coach can start teaching the mechanics of falling safely to the athletes in a controlled environment. When doing a skill that requires the athlete to land on their side, make sure the arms are pulled into their chest and they are staying '*tight,'* squeezing every muscle. Coaches can take beginners and simply start with only feet take-offs, having them try these different moves into a foam pit as a starting point until they understand the building process a bit more. As they start really understanding how to build the skills then you can take it to the trampoline and start introducing new take-off positions; Step-By-Step.

For the position, the athlete will have to simply create the picked position in the air at any time during the skill. It can be at the beginning of the skill, the middle or the end. This will teach them that certain skills require positions to be held at different times.

For example if you pick: **Seat Drop + Full Turn + Right + Pike** the athlete will learn very quickly *(probably with the help of the coach)* that they need to twist first and then do the position. Remember how we flip then twist in the biomechanics section - *Order of Operations*? This *Order* is used when building skills all the time.

You can always modify the test slightly by adding in unique take-off positions or positions in the air like animal shapes to keep the game fun and entertaining for the athletes. It also allows them to explore the building process with their own ideas. Exploring is crucial for human development so start them off on the right path with this drill.

I suggest you make it a team building exercise. I know that I call it a Spatial Awareness Quotient but functionally, you build spatial awareness like a map in your head of the different degrees on different axes so it is fundamentally testing how well your athlete can build the spatial awareness necessary for all possible skills.

If you want to quantify this drill with the young children to get an actual SAQ score here is how:

SAQ Test Formula

Step 1: Figure Out The Perfect Score = 5 x 4 x 2 x 4 = 160 Total Skills

Step 2: Give Your Athlete 10 Random Picks of each Element *(10 skills)*

Step 3: Give Each Athlete 20 Minutes to Solve the Skill

Step 4: Record How Many They Completed Successfully Out of 10 Skills

Step 5: Multiply That Score by 16 so it Relates to the Perfect Score

Step 6: Write Down the Score and Test Again Next Month with Different Take-off and Aerial Positions

SAQ Test Formula - Beginner Level 1 (Traditional)

5 Take-off positions and **4** aerial positions:

5 x 4 x 2 x **4** = 160 Total Skills/ 10 = 16

Each successful skill is awarded **16 points**

July 1, 2019 Sally does 4 out of 10 tries = 64/160 (4x16) = 40%

Aug. 1, 2019 Sally does 6 out of 10 tries = 96/160 (6x16) = 60%

Sept. 1, 2019 Sally does 10 out of 10 tries = 160/160 (10x16) =100%

Each level is separated into a Traditional and Freestyle component. By adding in new take-off positions and aerial positions coaches can change up the test to keep it fresh. Try bending one leg or another at different degrees and come up with 10 Freestyle positions in the air and on the trampoline to move athletes to Beginner Level 2.

SAQ Test Formula - Beginner Level 2 (Freestyle)

10 take-off positions and **10** aerial positions:
10 x 4 x 2 x **10** = 800 Total Skills / 10 = 80

Each successful skill is awarded **80 points**

Oct. 1st 2019 Sally does 4 out of 10 tries = 320/800 (4x80) = 40%

Nov. 1st 2019 Sally does 6 out of 10 tries = 480/800 (6x80) = 60%

Dec. 1st 2019 Sally does 10 out of 10 tries = 800/800 (10x80) = 100%

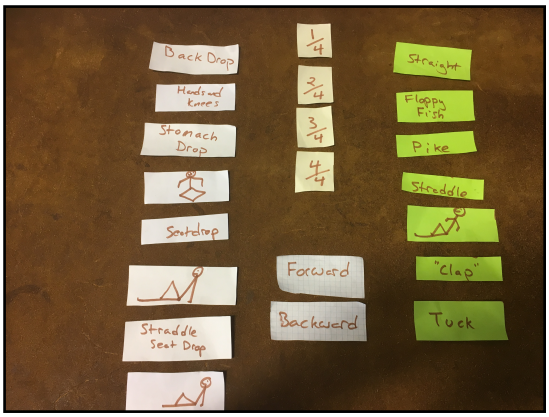
I would like to gather more data from the acrobatic industry that objectively shows *how* athletes are progressing. Currently, coaches are utilizing skin-fold measurements, running speed or medal counts. These values are indicative of only certain specific aspects of the sport that do not really indicate how effective the athlete is at learning. I have never seen a real ***Spatial Awareness Quotient*** that actually shows how effective the athlete is at safely navigating new skills and using the *Step-By-Step* approach. Now, you can't just claim to know *Step-By-Step*, we can quantify actual results with this method.

Like anything, not every test is perfect and you will see that some athletes may accidentally pick 'easier' combinations at random. However, general patterns will start to be apparent as you do this test over the long term. This way you can track the improvements of your athletes in a statistically relevant way. It should be apparent *how* this test demonstrates to the coach and athlete their knowledge of how to build

skills. At the beginning it will be more of a partnership, a ‘walkthrough’ with the coach; but as time goes on and the athlete really gets a handle on how to build-up their skills, then they can begin to be more independent. It will become more of a game they can start to play with their friends. They can also play it on their own like a personal game of *“ADD-ON.”* If you have athletes who want to do bigger skills but you don’t think they are ready, this is a great test that can show them in an objective way how they are not as ready as their Neocortex is telling them. The Neocortex tells younger athletes they can do skills that maybe they shouldn’t and this test will help slow down those athletes and show them there is a process to everything and they need to put in the time before moving up the ladder.

INTERMEDIATE LEVEL:

When the athlete gets 100% they can move onto the next level of the SAQ test/game. This version will be based on the exact same principals as the beginner levels but you will do ***Flips*** instead of ***Twists***. Again build your athletes SAQ Step-By-Step on a different axis with the same principal. You may have a potential issue if athletes pick combinations that require them to land in handstand or on their head. I have seen quite a few athletes who are strong enough to do these variations at a low level but if you don't think the athletes are ready for it, because they have not developed the conditioning yet, simply 'round up' or 'round down' the degree of flip.



For example, if they pick: **Back Drop + 3/4 + Forward + Pike** they will have to land in handstand to do the skill. Coaches can instead 'round up' to a 4/4 *(full flip)* to get the athlete to land on their back instead. This is where the coach will want to supervise this drill but should be having fun and can even try it themselves while they supervise.

$$TOP + DOF_1 + DOF_2 + P = Skill\ to\ Solve$$

TAKE-OFF POSITION *(TOP)*	DEGREES OF FLIP *(DOF_1)*	DIRECTION OF FLIP *(DOF_2)*	POSITION (P)
SEAT DROP	1/4	FORWARD	TUCK
BACKDROP	2/4 (HALF)	BACKWARDS	PIKE
STOMACH DROP	3/4		STRADDLE
HANDS & KNEES DROP	4/4 *(FULL FLIP)*		STRAIGHT* THIS ONE WILL BE TOUGH BUT PLAY WITH IT
STRADDLE SEAT DROP OR SPLITS			

As you can see, some of these skills are more advanced *(such as the straight position)* and will require a more methodical build-up of the skill. This is where the coach will want to supervise and help out to ensure the athlete takes all of the necessary small steps to accomplish these skills. If not, they will go too fast missing steps and rush the skill, not really understanding how it is built. In the case of a straight position, simply start in a tuck position and 'slowly' extend the body a few degrees every attempt. If you are not conducting a formal SAQ test, make a note in their training folder on which steps they struggled with, then address it during training over the next few weeks and come back to it. This is how you can obtain a quantifiable result in athlete comprehension, making it not just a fun drill but a *Spatial Awareness Quotient.*

You are not testing to see if the athlete is *knowledgable,* you are using this quantification to demonstrate *how methodically and safely the athlete will build skills in the future.* Do they understand *how* to build skills *Step-By-Step*, along the path to success? When calculating Level 2 scores, you don't even have to change the formula, as you can see it's mathematically the same, just change the twisting axis to the flipping axis. Simply print off the SAQ progress chart and keep a running tab for your athletes. This will show their *"evolution"* within the sport *(that will be referenced at the end of the story).*

SAQ Test Formula - Intermediate Level 1 (Traditional)

5 take-off positions and **4** aerial positions:
5 x 4 x 2 x **4** = 160 Total Skills / 10 = 16

*Each successful skill is awarded **16 points***

July 1, 2019 Sally does 4 out of 10 tries = 64/160 (4x16) = 40%

Aug. 1, 2019 Sally does 6 out of 10 tries = 96/160 (6x16) = 60%

Sept. 1, 2019 Sally does 10 out of 10 tries = 160/160 (10x16) =100%

SAQ Test Formula - Intermediate Level 2 (Freestyle)

10 Take-off positions and **10** aerial positions:
10 x 4 x 2 x **10**= 800 Total Skills / 10 = 80

*Each successful skill is awarded **80 points***

Oct. 1st 2019 Sally does 4 out of 10 tries = 320/800 (4x80) = 40%

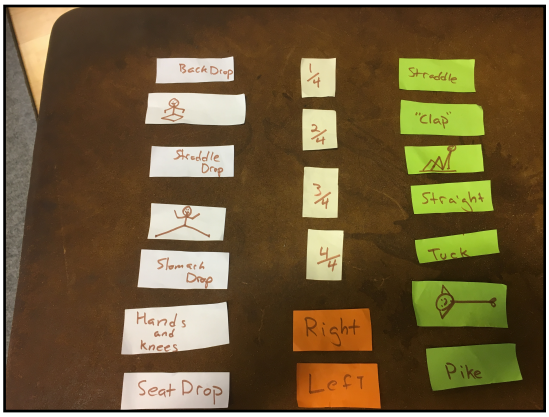
Nov. 1st 2019 Sally does 6 out of 10 tries = 480/800 (6x80) = 60%

Dec. 1st 2019 Sally does 10 out of 10 tries = 800/800 (10x80) = 100%

Notice how we are keeping the math very simple and all we changed is the way we calculated the SAQ score in Level 1 for the *'twisting'* axis and in the Intermediate level we calculated the exact same equation for the *'flipping'* axis.

ADVANCED LEVEL:

This is a much more advanced version of the game because you can see now we are adding in both **twists and flips** for two axes where before in the beginner and intermediate levels we just picked one or the other. Notice the position will be a tough aspect but again, the athlete will be forced to learn when to put in the position at the right time as well as to gradually develop the position over time. Remember when doing the unique side landings keep your arms in and stay tight. Also, if any weird combinations, just round up and land on feet if not obvious otherwise.



TOP + DOF_1 + DOF_2 + DOT_1 + DOT_2 + P = Skill to Solve

TAKE-OFF POSITION *(TOP)*	DEGREES OF FLIP *(DOF_1)*	DIRECTION OF FLIP *(DOF_2)*	DEGREES OF TWIST *(DOT_1)*	DIRECTION OF TWIST (DOT_2)	POSITION (P)
SEAT DROP	1/4	FORWARD	1/4	LEFT	TUCK
BACKDROP	2/4 (HALF FLIP)	BACKWARD	2/4 (HALF TWIST)	RIGHT	PIKE
STOMACH DROP	3/4		3/4		STRADDLE
HANDS & KNEES DROP	4/4 *(FULL FLIP)*		4/4 (FULL TWIST)		STRAIGHT* THIS ONE WILL BE TOUGH BUT PLAY WITH IT
STRADDLE SEAT DROP (SPLITS)					

Notice how we don't mention any double and triple flips? You can do the exact same SAQ with those bigger tricks once you pass all three levels. Generally speaking, however, most people will have a hard enough time with these skills as they are, so I have limited the test to just these three basic levels and only single flips but you can see how it would be possible to build-up this platform and modify the SAQ test with bigger skills or do the test in different disciplines *(such as tumbling, double mini or floor)* . If you are going to have the athletes do doubles and triples then you need to have a deep fluffed foam pit to begin with, maybe with a soft mat on top, to quantify the landing. **Do not try to do these variations on the trampoline or you will risk serious injury.** I know some of you may not listen to this warning and attempt it anyway, but you do so at your own risk. I do not recommend it unless you have a great understanding of building these skills and you can do every single combination on this SAQ test.

SAQ Test Formula - Advanced Level 1 (Traditional)

5 Take-off positions and **4** aerial positions

5 x 4 x 2 x 4 x 2 x **4** = 1,280 Total Skills / 10 = 128

*Each successful skill is awarded **128 points***

July 1, 2019 Sally does 4 out of 10 tries = 512/1,280 (4x128) = 40%
Aug. 1, 2019 Sally does 6 out of 10 tries = 768/1,280 (6x128) = 60%

Sept. 1, 2019 Sally does 10 out of 10 tries = 1,280/1,280 (10x128) = 100%

SAQ Test Formula - Advanced Level 2 (Freestyle)

10 Take-off positions and **10** aerial positions

10 x 4 x 2 x 4 x 2 x **10** = 6,400 Total Skills / 10 = 640

*Each successful skill is awarded **640 points***

Oct. 1, 2019 Sally does 4 out of 10 tries = 2,560/6,400 (4x 640) = 40%

Nov. 1, 2019 Sally does 6 out of 10 tries = 3,840/6,400 (6x 640) = 60%

Dec. 1, 2019 Sally does 10 out of 10 tries = 6,400/6,400 (10x 640) = 100%

Note: If there are any coaches who really want to begin documenting this please let me know. I would be very interested to see its applications in the community. We have already been systematically testing it across Europe between Traditional and Freestyle athletes.

Again, we have a video of how to administer this test on the FTA website so please see that video before doing it with your athletes. I understand this may be a lot to take in through written word, which is why we are putting all this information on the website as well.

Feel free to use the SAQ as a game and drill for athletes to learn how to build skills. The entire concept of this story is showing *how* athletes *should* learn; not how to *'do'* skills but how to *'build'* skills. This is important because in the future, when given a new skill to solve they haven't seen before, the athlete is equipped with the knowledge of *how to build* the skill; Step-By-Step.

So what have the results been as we have administered this test?

We have administered it to over 20 Traditional Gyms, including Team Gym athletes, as well as 20 trampoline park events with Freestyle athletes. Preliminary results show that both sides of the sport have a natural tendency to *"huck and chuck"* new skills when a coach is not present telling them specifically what to do. Every time we do the test, we start by administering it without advice or instructions to observe their natural behaviour. This shows us what was taught to them before the clinic. Not one subject out of the roughly 800 athletes *(40 x 20)* thought to break skills down into pieces. Every single one automatically just started throwing the body at different angles hoping to figure it out and land the skill *("Hot or Cold" Trial and Error method)*.

We would then bring them together and discuss that we would like them to start building skills and there was a noticeable difference in success rates afterwards in *"round 2"* just within the 20 minute educational seminar and few examples demonstrated with athletes in real time regarding building skills and not throwing them.

This disproves the claims made by some critics that only Freestyle athletes are reckless enough to *"huck and chuck."* The facts are that this mentality is hardwired into the brain and the question remains as to whether it is a lack of proper coaching education throughout the Traditional industry or if it is a deeper biological circuit. As mentioned, I believe it is hardwired into the psychology of human behaviour to naturally want this dopamine release of *"huck and chuck."* Further research needs to be done but at this point I am firmly convinced that between the practical observations and current literature this is an artifact of hardwired human behaviour, not simply inadequate coaching techniques. I believe that with an increased focus on building athletes we can reduce this mentality or at least control it to a larger degree, increasing safety across the Traditional and Freestyle sectors. When you start looking at the world as a place you can build within, things become easier to manage and understand. This will increase safety over the long term.

This process is precisely why the only injury we have ever had at any clinic whether it is Flyboarding, Snowboarding, Windtunnel Flying, Freestyle Motocross or any Traditional acrobatics was a sprained pinky before I started applying the *"arms in"* technique for all twisting drills. I see too many coaches and athletes simply throwing basketballs at a hoop, often with their eyes closed. Why wouldn't you want to simply walk over to the basketball net, take out a ladder and place the ball in the hoop successfully the first time?… **I guess there is not enough excitement in guaranteed success…**