

ACA SKILLS COMBINE



WHY ARE WE HERE?

INTRODUCTION OF ACA SKILLS COMBINE

- Athletic performance
- Athlete health & wellness
- Development of the 4 C's
 - Competence
 - Confidence
 - Connection
 - Character



ACA ATHLETIC DEVELOPMENT PILLARS

Physical Fitness

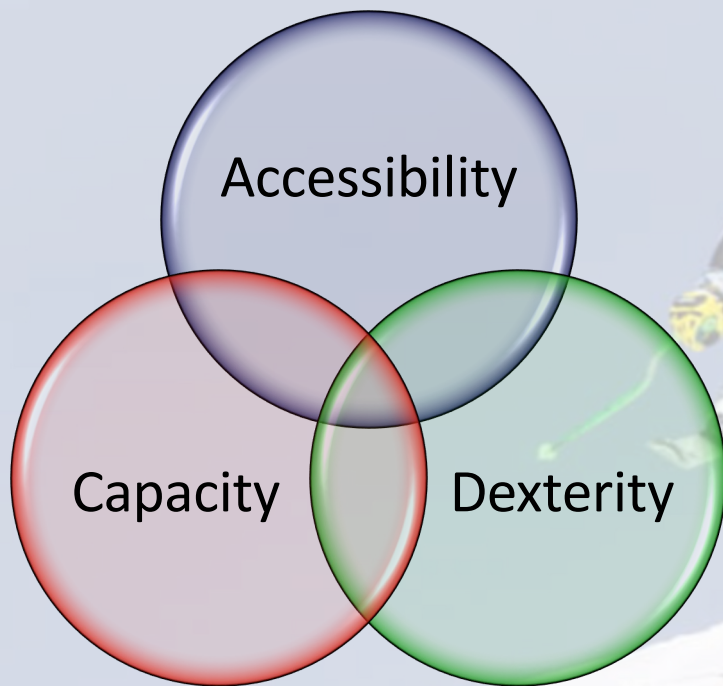
Technical/Tactical

Mental Performance/Life Skills

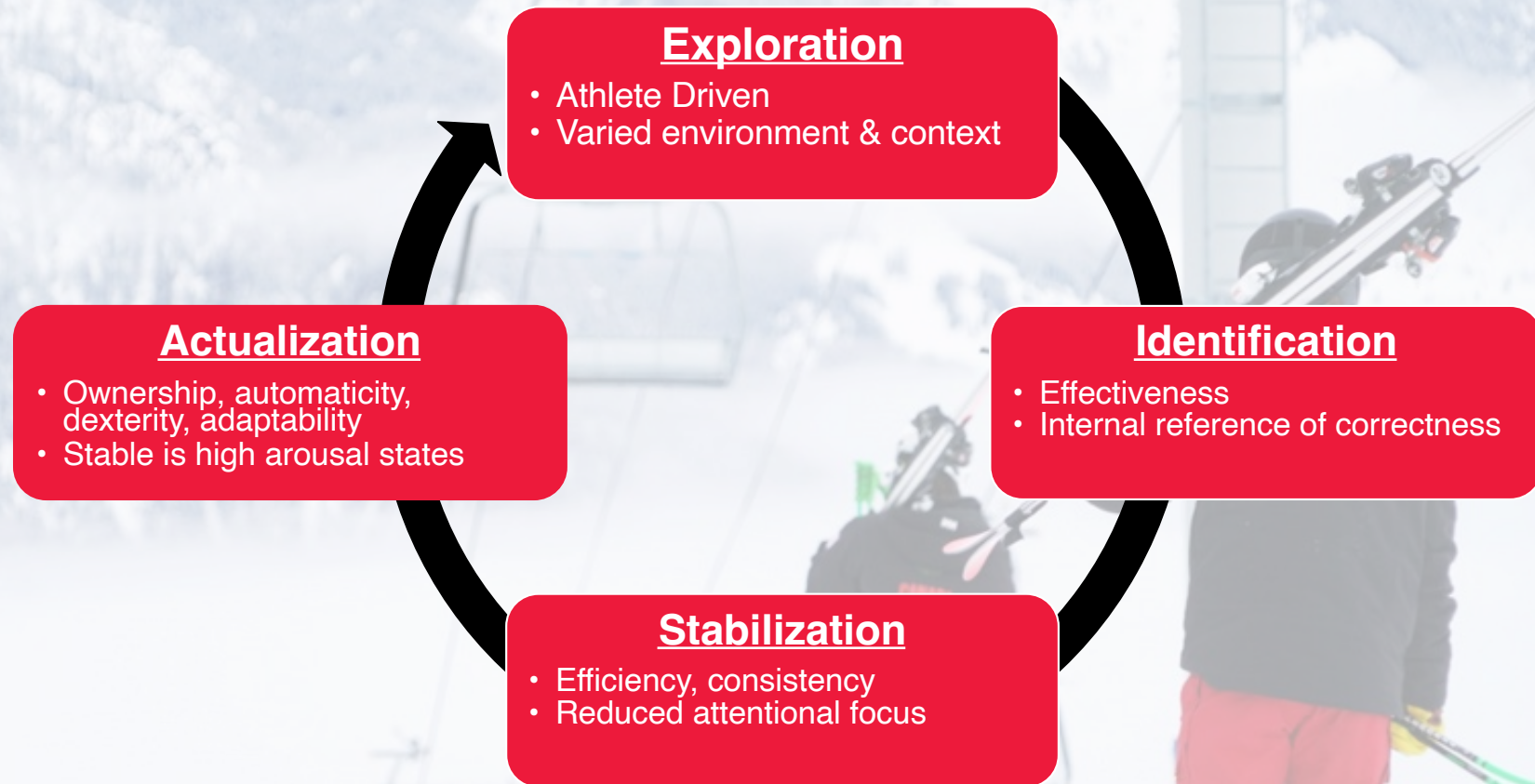
Competition



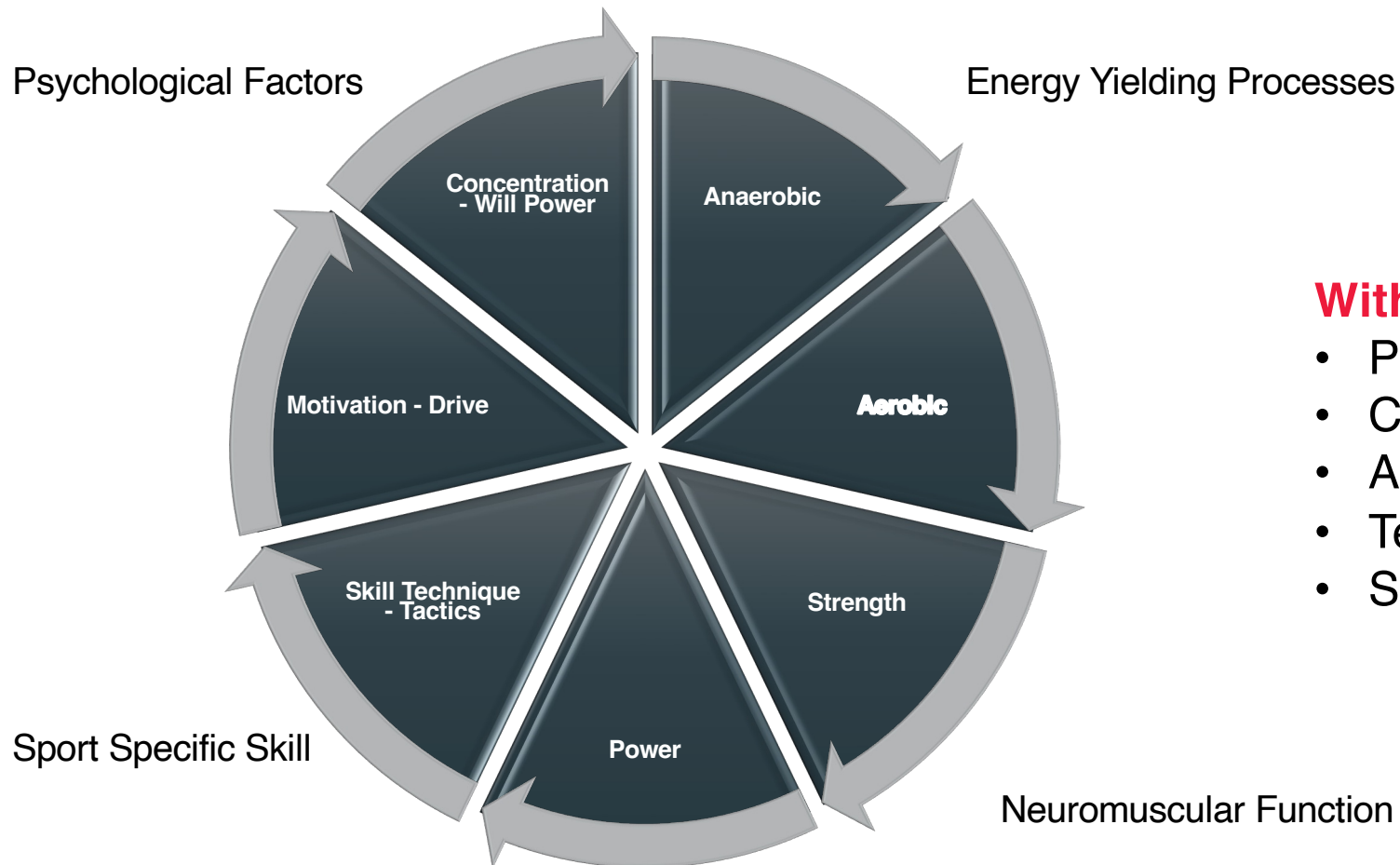
WHAT DO WE NEED?



DEVELOPING ATHLETIC ABILITIES



PERFORMANCE FACTORS GOVERNING INDIVIDUAL PERFORMANCE



Within Each Athlete

- Potential
- Capacity
- Ability
- Technique
- Skill



Survivable ≠ Sustainable





LONG TERM DEVELOPMENT



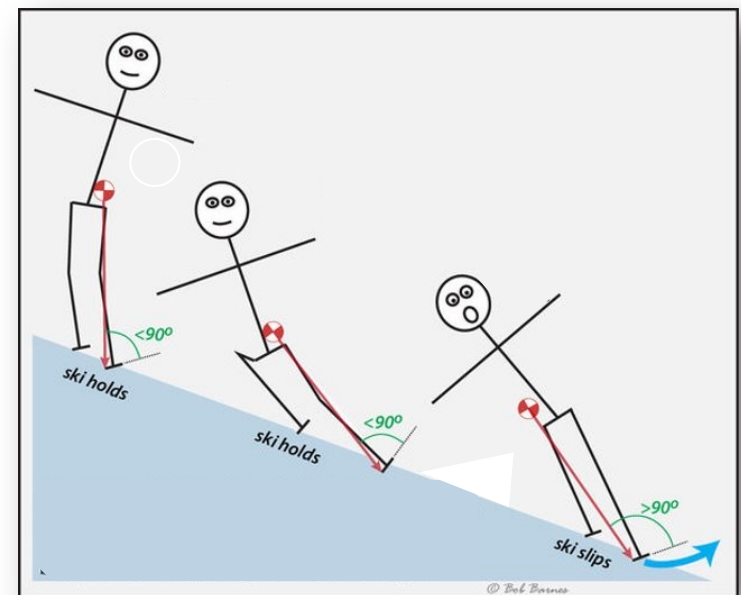
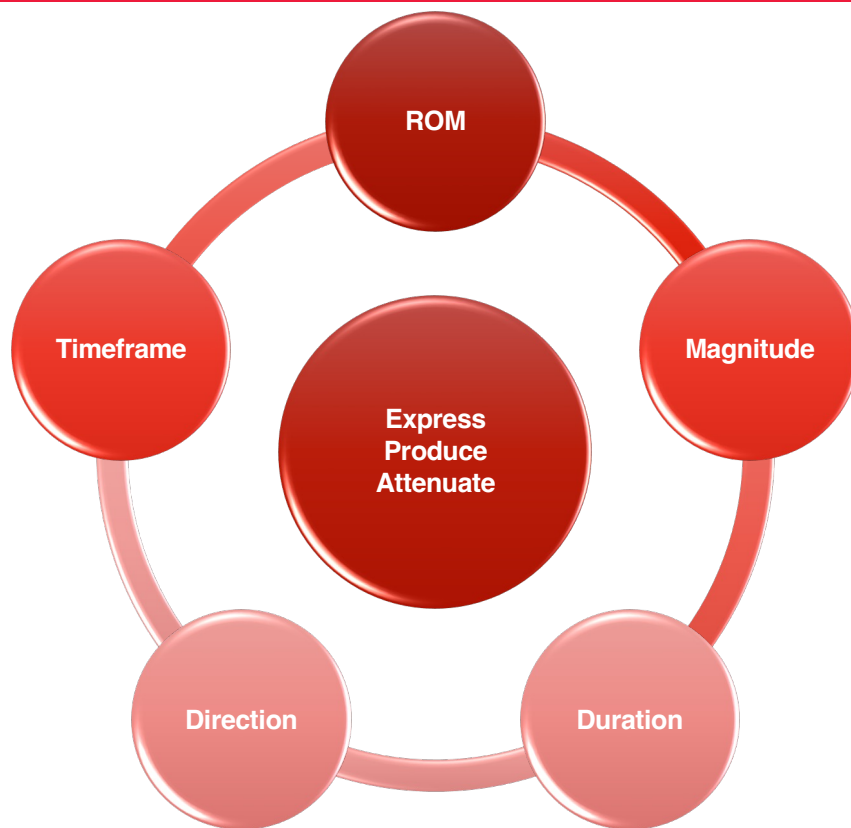
WHAT ARE WE PREPARING TO EXECUTE...

The content of one session of ski training during the preparation and competition periods	Preparation Period	Competition Period
Slalom <ul style="list-style-type: none"> Estimated time per turn = 0.8s Sharp increase in ground reaction force up to 4x body weight *avg. 52s in length @ 54km/h	6-12 runs on a partial to full length course x 40-60 turns (240-720 turns)	2-6 runs on a partial to full length course x 50-60 turns (100-360 turns)
Giant Slalom <ul style="list-style-type: none"> Estimated time per turn = 1.4s Maximal ground reaction force up to 3.2x body weight *avg. 77s in length @ 65/85 km/h	6-12 runs on a partial to full length course x 25-50 turns (150-600 turns)	2-5 runs on a partial to full length course x 25-50 turns (50-250 turns)
Super G <ul style="list-style-type: none"> Estimated time per turn = 2.3s Smooth increase in ground reaction force up to 2.6x body weight *avg. 93s in length @ 86/100 km/h	4-8 runs on a partial to full length course x 15-40 turns (60-320 turns) * Estimated 20%-time spent w/o turns	2-4 runs on a partial to full length course x 15-40 turns (30 – 160 turns)
Downhill <ul style="list-style-type: none"> Estimated time per turn = 2.3s Maximal ground reaction force up to 2.6x body weight *avg. 121s in length @ 94/150 km/h	4-8 runs x 15-35 turns (60-280 turns) * Estimated 55%-time spent turning, 45%-time gliding and 36.8% of all time in a tuck position	3-6 runs x 15-35 turns (45-210 turns)

Gilgien, Matthias & Reid, Robert & Raschner, Christian & Supej, Matej & Holmberg, Hans-Christer. (2018). The Training of Olympic Alpine Ski Racers. Frontiers in Physiology. 9. 10.3389/fphys.2018.01772.



FORCE



SKILL EXECUTION & PHYSICAL FITNESS

Analysis and research have shown that the following physical fitness attributes are characteristic of top ski racers:

1. Good aerobic work capacity (high maximal oxygen uptake/ $\dot{V}O_2$ Max)
2. Great muscular strength in terms of dynamic muscle function
3. Significantly prolonged muscular endurance, in terms of dynamic muscle function in given submaximal work
4. Well-developed muscular coordination

The assessment and quantification of these qualities can help identify potential performance deficits and track long-term performance trends.



REDUCING FATIGUE & INJURY IS THE GOAL

- World Cup Level 23-37 injuries per 100 athletes
- World Cup 2006-2009
 - 69 injuries- 55 from turning, 15 from landing a jump
- 431 Elite Ski Racers in Sweden (16yrs)
 - 50% sustained 1 injury
 - 85% occurred during ski training
 - 97% were mod-severe!

Majority of injuries occurred in the last segment of a race
Fatigue and lack of concentration

Most common Injured body part:

Knee
Lower back or Leg
Head
Upper extremity

Most common Injured body part in youth <18yrs:

Knee
Spine
Lower Leg/Foot/Ankle

Tarka MC, Davey A, Lonza GC, O'Brien CM, Delaney JP, Endres NK. Alpine Ski Racing Injuries. Sports Health. 2019





ACA SKILLS COMBINE



ACA SKILLS COMBINE



- Reemphasize the importance of executing fundamental skiing and physical fitness skills identified within the new athlete development matrix (ADM) through the use of a skills combine format
- The identified skills for the U16 Nationals Combine did not include all the skills listed within the ADM, just a select few.
- The introduction of a Skill Combine emphasizes the skill proficiencies required at elite-levels of ski racing while increasing awareness of the necessary physical fitness attributes that significantly contribute to long-term ski racing success.

FOCUS IS ON THE PROCESS



SKIING SKILL DRILL OPTIONS

1. Outside Ski Turns ★
2. Spiess ★
3. Snowplow → wedge → power plow progression
4. Edge Sets
5. Pivot slips (braquage)
6. Skating ★
7. Javelin Turns
8. One ski skiing
9. Pole Plant
10. Timed Starts ★
11. Turns through wave track (terrain) ★
12. Use of varying hand positions, turn shape and terrain with above drills



Included in ACA Skills Combine currently



ACA SKILLS COMBINE



Skiing Exercise	Skiing Skill Component	Maximum Points Possible
Timed Skating Starts	Start technique with skating: all joints working sequentially: ankle, knee, hip	200
Outside Ski Turns	Edging, platform, balance w/poles or w/o poles	200
Speiss (Hop Turns)	Edging, rotary, pole plant, timing, coordination, all joints working sequentially	200
Timed Turns in Wave Track	Movement over terrain while maintaining dynamic balance to carve turns	200
Timed Skating without poles	All joints working sequentially: ankle, knee, hip	200

*Skills can be subject to change due to weather or unforeseen circumstances, final skills will be confirmed at Team Captain Meeting(s)

- Intended to evaluate and reward a skier's skill development separate from the traditional U16 Championship racing events.
- There were five skiing skill exercises that made up the ACA Skill Combine
 - No skiing skill exercise is ranked more important than another.
- Clubs and coaches should be setting aside time to practice the skills identified below and other skiing skill-based activities



OUTSIDE SKI TURNS

OUTSIDE SKI TURNS

The ability to ski on the outside ski is essential to optimally maintain balance against extreme external forces created by a tight turn radius and/or high speeds. Without an inside ski to assist with lateral balance and regulate pressure the skier is limited to their options with regards to what they can do with the ski.

Goal

To ski solely on the outside ski prior to, during and after the ski turn during eight (8) medium radius highly carved turns connected with a traverse on one ski.

Equipment

- 4 GS panels to establish a start and finish
- 20 brushes to outline the evaluation corridor

Scoring

The scoring rubric will be used in coordination with the essential elements of perfect execution checklist to establish the athlete's score.

Slope

Easy intermediate groomed terrain.

Description

- Athlete makes eight carved medium radius turns with weight entirely on the outside ski
- The inside/uphill ski is kept entirely off the snow during the turn
- Athlete concludes turn by remaining on the old outside ski for two ski lengths
- Athlete will make an identifiable weight transfer to the new outside ski
- Athlete will initiate the new turn after a traverse of two ski lengths on the uphill (new outside) ski
- Pole may only be used to swing and touch the snow, not for balance support against the snow

Essential elements for perfect execution

- Inside/uphill ski carried off the snow 100% of the time
- A deliberate weight transfer can be identified when the athlete transfers pressure to the new outside ski
- Prior to the turn, the new outside ski is skied for two ski lengths to indicate balance is solely on the new outside ski
- After turn completion the outside ski is skied for two ski lengths to indicate balance is still 100% outside ski dominant
- Turns are mainly carved
- Speed is consistent throughout entire maneuver
- Turn shape is relatively round
- Ski poles are kept off the snow except if used for a pole plant



Coaches Eye

- **Dynamic Balance** Is dynamic balance demonstrated by keeping the uphill/inside ski entirely off the snow during turn initiation through completion?
- **Initiation** Are the athlete's hands forward and always remain in the athlete's visual path? Are the ankles and knees flexed and do the ankle and knee move sequentially to roll the outside ski on edge?
 - Outside ski performance: ski is rolled onto edge, ski tip flexes, edge engages and begins to carve.
- **Turning** Does the inside/uphill ski remain lifted throughout the turn?
 - Outside ski performance: ski's turning edge is engaged, ski is bent and carving
- **Completion** Edge angulation is decreased, upper body remains squared and in the direction of travel, wrist moves to enable pole touch.
 - Outside ski performance: ski's edge is released
- **Transition** Does the athlete demonstrate a deliberate and smooth weight transfer when the skier transfers pressure to the new outside ski?

Athlete Instructions

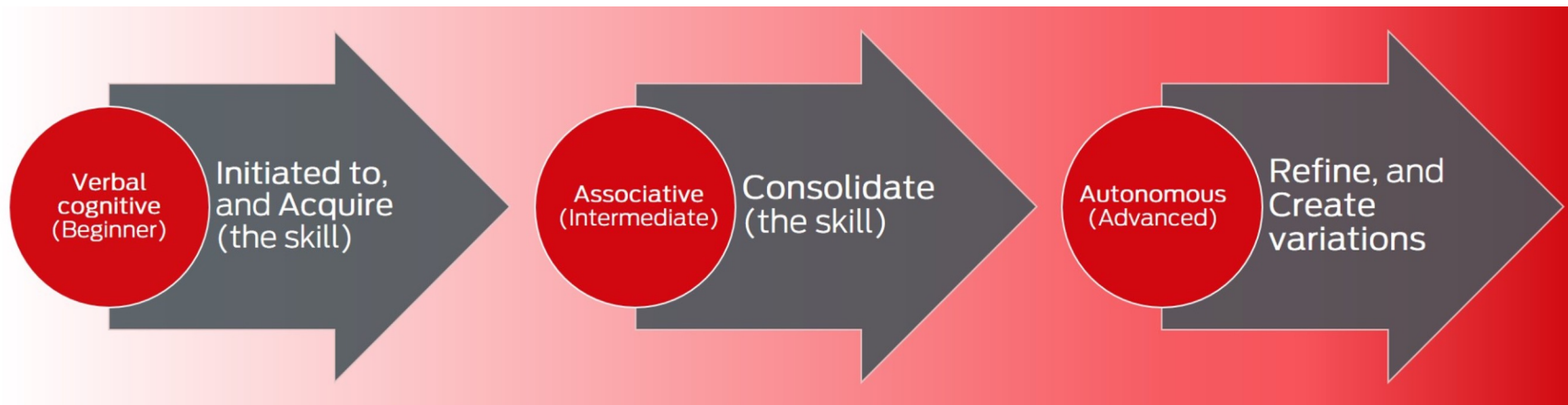
- Ski eight round, carved turns with all your weight on your outside ski
- Lift the inside ski off the snow for the whole turn
- Between turns, step onto the uphill ski and lift the old outside ski as you traverse before you start into the turn
- Your poles are only used for pole plants, do not drag them, or use them for balance
- Your speed is the same for all the turns





Skill development

Stages of skill development





Skill development

	Beginner		Intermediate
	Initiate	Acquire	Consolidate
Key points to look for	<ul style="list-style-type: none">• First contact• Participant may have no idea of what to do	<ul style="list-style-type: none">• Participant can coordinate and execute key components of movements• May lack synchronization and flow (must think about how to do the movement)	<ul style="list-style-type: none">• Skill executed correctly• Good synchronization and rhythm when not under pressure• Inconsistent performance under pressure
Participants need	<ul style="list-style-type: none">• A clear mental picture of correct execution• To feel safe doing skill• To become comfortable with some of the movements	<ul style="list-style-type: none">• To understand what they have to do• Lots of repetitions at slower pace• To practice on both sides• Trial and error with coach feedback	<ul style="list-style-type: none">• Lots of repetitions, under varied conditions• To increase difficulty• More trial and error with less feedback• To practice under fatigue conditions

ACA SKILLS COMBINE – EVALUATION SCORING

Stages of Skill Acquisition	Presence of Essential Skill Elements	Raw Score	Qualitative Points
Cognitive	Elements were not observed or are not present	1	33
	Elements are beginning to appear	2	67
Associative	Elements appear, but not with necessary consistency	3	100
	Elements appear regularly at a satisfactory level	4	133
Autonomous	Elements frequently appear above required level	5	167
	Elements continuously appear at a superior level	6	200



ACA SKILLS COMBINE – INCLUDES FITNESS!



Exercise	Physical Fitness Component	Maximum Points Possible
Penta Jump	Lower Body Strength, Power, Coordination	125
Max Push Ups (Tempo Imposed)	Upper body strength, core stabilization, endurance, and coordination	125
90 sec Box Jump Test	Anaerobic endurance	325

The U16 Nationals skills combine physical fitness components mirror evaluations used in ACA's primary fitness combine, but with fewer exercises.



CREATING YOUR CLUB COMBINE



The U16 National Skills Combine format can be utilized at the local club level to create excitement and engagement around skill development within the identified pillars of physical fitness, skiing technique & tactics

Weekend 1	Weekend 2	Weekend 3	Weekend 4	Weekend 5
Skating	Timed Starts	Spiess	Outside Ski Turns	Timed turns in wave track
Hexagon Obstacle	Standing Long Jump	Push Ups	Sit Ups	Box Jumps



IMPLEMENTING A SKILLS COMBINE AT THE CLUB - SAMPLE

EXAMPLE SCORE CALCULATION

	Athlete A				Athlete B				Athlete C				Athlete D			
Skiing Skill Combine	Average Raw Score or Time (s)	Qualitative Event Points Earned	Overall Event Rank	WC Points	Average Raw Score or Time (s)	Qualitative Event Points Earned	Overall Event Rank	WC Points*	Average Raw Score or Time (s)	Qualitative Event Points Earned	Overall Event Rank	WC Points*	Average Raw Score or Time (s)	Qualitative Event Points Earned	Overall Event Rank	WC Points*
Outside Ski Turns*	2.67	88.67	10	100	2.67	88.67	34	67	2.00	66.67	67	34	3.00	100.00	8	120
Timed Skating Starts	5.68		24	77	6.78		64	37	4.57		10	100	77		24	77
Spies (Hop turns)*	4.00	133.33	9	110	2.33	78.00	10	100	1.67	55.67	50	51	2.67	88.67	30	71
Timed Turns in Wave Track	25.67		40	61	23.46		25	76	26.58		59	42	40		61	40
Timed Skating without Poles	35.67		35	66	29.75		12	89	32.73		32	69	57		44	57
Composite Skiing Skill Score & WC Points Earned				414				369				296				365

	Athlete A				Athlete B				Athlete C				Athlete D			
Physical Fitness Combine	Raw Fitness Score	Fitness Points (scoring table)	Overall Event Rank	WC Points	Raw Fitness Score	Fitness Points (scoring table)	Overall Event Rank	WC points Earned	Raw Fitness Score	Fitness Points (scoring table)	Overall Event Rank	WC points Earned	Raw Fitness Score	Fitness Points (scoring table)	Overall Event Rank	WC points Earned
Penta Jump	12.5	63	15	86	13.2	75	10	100	11.2	79	54	47	14	89	5	140
Push Ups	35	75	35	66	22	48	67	34	37	79	26	75	21	79	69	32
90 Second Box Jump	67	38	28	73	77	92	24	77	70	173	26	75	90	282	1	200
Composite Physical Fitness Score & WC Points Earned		176		225		215		211		331		197		450		372

	Athlete A			Athlete B			Athlete C			Athlete D		
	Fitness Combine WC Points Earned	Skiing Skill Combine WC Points Earned	Total World Cup Points Earned	Fitness Combine WC Points Earned	Skiing Skill Combine WC Points Earned	Total World Cup Points Earned	Fitness Combine WC Points Earned	Skiing Skill Combine WC Points Earned	Total World Cup Points Earned	Fitness Combine WC Points Earned	Skiing Skill Combine WC Points Earned	Total World Cup Points Earned
Total Overall Score	225	414	639	211	369	580	197	296	493	372	365	737
Event Ranking	2nd	1st	2nd	3rd	2nd	3rd	4th	4th	4th	1st	3rd	1st



SUMMARY



1. The goal is shift the culture to foster the development of healthy, fit and successful ski racers
2. Biological maturation plays heavily into proper athlete development – use of the maturation tool periodically throughout the year is critical for U12 to U16/U18 athletes.
3. Quality always over quantity
 - The first goal is to perform the tests competently and safely
 - Athletes must be educated on the tests
 - The second goal is to perform in the tests
4. You can't change what you don't measure – this is an important step for us
5. Ensuring athletes have a strong foundation technically, physically, mentally and tactically enhances performance and reduces risk for injury while building confidence
6. Pre-combine preparation always makes for a smoother day/event and creates a more positive environment
7. Athlete health and safety always come first



