



A GRIT HOCKEY RESEARCH REPORT

ARE YOUR SKATES TOO SHARP?

**Skate Sharpening for Minor Hockey: Bite, Glide, Weight, Ice, and the
Flat-Bottom Alternative**

Every sharpening ends with a decision most families have never been walked through: how deep to cut the hollow. That one number decides how hard a player's edges bite and how freely the blade glides — and the right answer depends on the player's weight, the ice, and how the player skates. This report explains the geometry, the trade-off, the two sharpening systems in use today, and a method for finding the right cut for a young player.

GRIT Hockey • London / Middlesex, Ontario • October 2026

TL;DR

The short version

The whole report on one page. If you read nothing else, read this page. The pages after it explain the reasoning in full.

- **Deeper hollows grip better and glide worse; shallower hollows glide better and grip less.** A deep hollow holds the ice in turns, stops, and starts, but it drags on every stride. A shallow hollow runs faster and costs less effort, but it holds less in a hard turn. Choosing a hollow means balancing grip against glide.
- **Grip depends on how the skater uses his edges, not only on the cut.** A skater who leans into the edge properly can hold a shallow hollow without slipping. When a skater loses an edge, the usual causes are technique, a dull edge, or edges that are not the same height — not the hollow he chose.
- **Heavier skaters need shallower hollows; lighter skaters need deeper ones — and skill can override both.** A heavy skater's weight pushes the edge into the ice by itself, so his cut can be shallow. A light skater's weight does not push the edge in far enough, so his cut must be deeper. But a heavy skater with poor technique may need a deeper hollow than a light skater with excellent technique. The chart on page 6 gives a starting hollow for each combination of weight and skill.
- **A hollow can be too deep.** Skates cut too deep catch when the player tries to stop, chatter instead of sliding smoothly, and make it hard to pivot and change direction. This is worst for strong, heavy skaters, because their weight and power drive a deep edge too far into the ice.
- **Hard ice needs a deeper hollow; soft ice needs a shallower one.** An edge has trouble biting into hard, cold ice, so the cut has to be deeper to hold. In soft ice the blade sinks in easily, and a deep hollow only slows the skater down and tires his legs. Choose the hollow for the rink your player skates at most.
- **The two edges of the blade must be exactly the same height.** If one edge sits higher than the other, the skates feel wrong no matter which hollow was chosen, and changing the hollow will not fix it. When you get skates sharpened, ask the shop whether they check that the edges are level.
- **Flat Bottom V (FBV) is a different shape of cut.** It glides almost as well as a shallow hollow and grips almost as well as a deep one. It does not remove the choice — the player still has to decide how much grip he wants. Page 9 explains FBV and how its sizes compare with regular hollows.
- **No study can tell you the right hollow for your player.** Start with the chart on page 6. After that, change the hollow by the smallest amount — one step, which in this report means 1/16 of an inch — and let the player skate on it two or three times before deciding. Page 12 lists the signs that tell you whether to go deeper or shallower.

THE GEOMETRY

What a hollow actually is

A hockey blade does not have one edge. It has two.

Sharpening grinds a shallow groove — the hollow — along the bottom of the blade. The groove leaves a raised edge on each side: the inside edge and the outside edge. A skater turns, stops, and accelerates on those two edges, and glides on the surface between and beneath them.

The hollow is named by the radius of the arc the grinding wheel is dressed to cut — the **radius of hollow**, or ROH. A **smaller** radius cuts a **deeper**, narrower groove. A **larger** radius cuts a **shallower**, flatter one. The number runs opposite to the depth, which is why sharpening conversations confuse so many families: a “bigger hollow” (1 inch) is the shallowest cut on the board, and a “smaller hollow” (3/8 inch) is the deepest.

Two measurements describe what the skater actually feels. The **groove depth** is how far the centre of the blade sits above its edges. The **bite angle** is the angle at which each edge corner meets the ice: the steeper the angle, the more aggressively the edge presents itself when the skater leans. Both are fixed by the radius and the width of the steel.

Radius of hollow	Groove depth	Bite angle	Character
3/8"	0.0044 in	8.8°	Deepest common cut — maximum bite, maximum drag
7/16"	0.0037 in	7.5°	Deep — strong bite for lighter players
1/2"	0.0033 in	6.6°	The common default — most shops' standard cut
9/16"	0.0029 in	5.8°	One step toward glide from the default
5/8"	0.0026 in	5.2°	The common adult standard — glide-forward
3/4"	0.0022 in	4.4°	Shallow — speed and efficiency first
7/8"	0.0019 in	3.7°	Very shallow — strong skaters, some goalies
1"	0.0016 in	3.3°	Shallowest common cut — maximum glide

Depths and angles computed from the geometry of a circular groove across standard 2.9 mm hockey steel; they agree with published sharpening tables within rounding. Moving one row — one sixteenth of an inch of radius — is one **step**. Every recommendation in this report is made in steps, because one step is the smallest change a skater can judge fairly.

THE TRADE-OFF

Bite versus glide

Every stride spends the hollow twice: once when the edge pushes, once when the blade runs.

Bite is what a player does on an edge: the first three strides out of a stop, a tight turn at speed, a hard stop that sprays ice. In each case the edge must penetrate the surface and hold against a sideways force. The deeper the hollow — the steeper the bite angle — the deeper the edge sits and the more force it holds before it lets go.

Glide is everything between those moments: the straight-line running that makes up most of a shift. Penetration is drag. An edge sitting deep in the ice is plowing a shallow trench on every stride, and the player's legs pay for it — in top speed and in fatigue across a game.

The drag is not just reasoned — it has been measured. In sled tests at the University of Calgary, blade friction fell as the hollow got shallower: about 11 percent lower at a 1/2-inch hollow and 19 percent lower at 3/4 inch than at a deep 1/4 inch (Federolf and Redmond, 2010). A deeper hollow pays for its grip on every glide, in numbers.

A traditional hollow therefore forces a choice, and the choice is structural, not a matter of sharpening skill. The wheel cuts one arc. That arc cannot sit deep for the turn and shallow for the straightaway.

“The deeper cut feels slower in a straight line and surer in a turn. The shallower cut feels faster, with a thinner margin in the turn. Both reports are correct — they are the same geometry described from two moments of the stride.”

Skill changes where a player can live on this trade-off. Holding an edge in a hard turn is partly technique: ankle control, knee bend, and managing the lean so the edge is loaded progressively rather than slammed. A strong skater holds a shallow cut that would wash out under a weaker one. That is why the shallow end of the ladder is crowded with elite skaters — and why their choices are the wrong template for a developing player. And note what the margin means: an edge lets go because it was badly loaded, dull, or uneven far more often than because it was shallow. Shallow does not mean losing your edge.

There is a second failure direction, and the modern game exposes it: an edge can hold **too well**. Transitions — the pivots, Mohawks, and direction changes that now occur every few seconds — are rotations of a loaded blade. An edge cut too deep for the skater resists that rotation. It catches in stops instead of sliding under control, makes transitions come out in segments instead of one motion, and has to be forced out of the ice to change direction. The same excess depth punishes power: a strong or heavy skater drives the edge past its working depth, and force that should propel is spent plowing. Too deep is not the safe side of the ladder. It is a different wrong answer.

It is also why “sharper” is the wrong word for most of these conversations. A fresh sharpening of any hollow feels sharp for a game or two. The hollow is not about sharpness. It is about where the blade sits in the ice for the whole life of the edge.

THE MAIN FACTOR

Weight decides more than preference

Bite is penetration, and penetration is pressure.

An edge holds because the player's weight is concentrated onto a few millimetres of steel, driving it into the surface. Double the weight on the same edge and you roughly double the pressure driving it in. The hollow sets the shape of the edge; the player's mass decides how far that shape sinks.

This produces the central fact of hollow selection, and it runs opposite to many families' intuition:

“A light player needs a deeper hollow, because only the geometry can give the grip his weight cannot. A heavy player needs a shallower one, because his weight supplies the penetration and the geometry should get out of the way.”

Put the same cut under two players and it is not the same cut. A 70-pound youth player on a 5/8-inch hollow barely sinks the edge; the skate feels slippery and untrustworthy in turns. A 220-pound adult on a 1/2-inch hollow buries the edge; the skate feels glued down and exhausting. Same numbers, opposite experiences — the standard illustration in sharpening instruction, and the reason “what hollow should I get?” has no answer until “how much do you weigh?” is answered first.

Published guidance follows the physics: manufacturers place typical youth players at 1/2 inch and heavier senior players at 5/8 inch, and a European rule published by ProSharp, the Swedish profiling company (body weight in kilograms divided by π), returns about 7/16 inch for a 75-pound player. The sources agree on the neighbourhood, not the row. Weight is the starting input, not the only one — skill moves the answer a full step in either direction. Page 6 combines the two into a single starting chart.

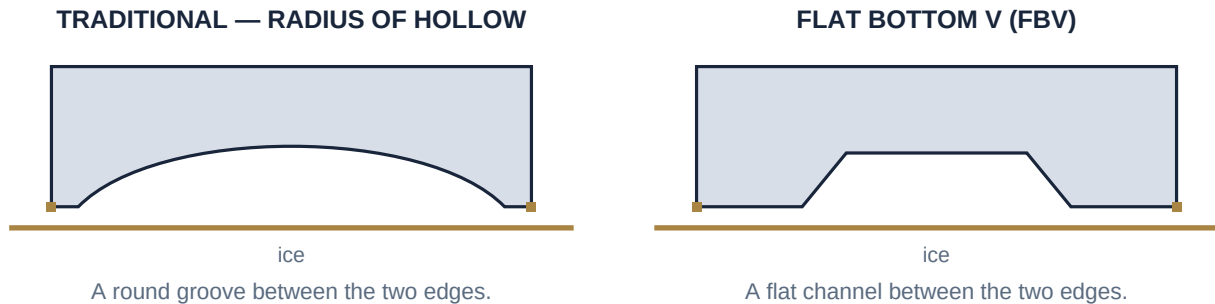
Published charts do disagree at the edges. Wissota, a sharpener manufacturer, starts the lightest skaters deeper, at 3/8 inch; Bauer's home-sharpener guidance starts everyone shallower, at 5/8 to 3/4 inch. The chart on page 6 follows the majority guidance — the disagreement is recorded here rather than smoothed over.

Growth quietly changes the right cut. A minor hockey player can gain ten or fifteen pounds in a year. The hollow that was right in September can be one step too deep by spring — not because the player's taste changed, but because the main input did. Recheck the cut when the player grows, the way you would recheck skate size.

THE TWO CUTS, SIDE BY SIDE

Two cuts, one chart

What the two systems look like under the blade — and where a player starts in each.

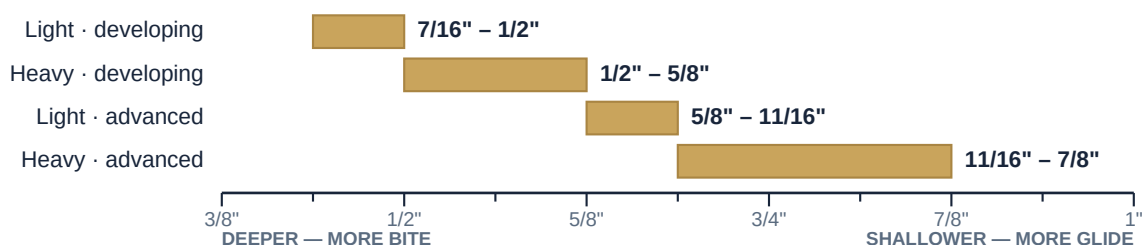


Cross-sections of the bottom of the blade, greatly enlarged, groove depth exaggerated. Gold squares mark the two edges — the only parts of the blade that grip.

The starting chart — traditional hollow by weight and skill. *Developing:* still building edge control; edges are loaded inconsistently. *Established:* sound club-level edge work. *Advanced:* elite edge control — the edge is loaded progressively, at full lean, on demand.

Player weight	Developing skater	Established skater	Advanced skater
Under 90 lb	7/16"	1/2"	5/8"
90–130 lb	1/2"	9/16"	5/8"
130–170 lb	1/2"	5/8"	11/16"
Over 170 lb	9/16"	11/16"	3/4"

The same chart, as windows. The range a skater of that weight and skill usually settles in — the chart's starting point sits inside it.



Estimates from page 5's guidance, not a prescription; ice shifts a skater within his window (page 7).

Read two cells against each other. A 150-pound player with developing edge control starts at 1/2 inch — a deeper cut than an 80-pound player with excellent control, who starts at 5/8. The heavier, weaker skater's inconsistent loading needs the margin his technique cannot yet supply; the lighter, excellent skater loads an edge so well that a shallower cut holds — and glides better. Weight alone would have given both the wrong answer.

Starting in FBV instead: Blackstone itself publishes only three anchors — a bite like 3/8"–1/2" ≈ 100/75 · 5/8"–3/4" ≈ 90/75 · 1" ≈ 90/50. The fuller chart, the dealer chart that fills its gaps, and the point where the two conflict are on page 9.

THE ICE

Harder ice needs more bite

The same cut is not the same cut at every rink.

Ice is not one surface. Its hardness varies with the plant, the resurfacing water, and the season. Cold, hard ice resists penetration: the edge rides higher, holds less, and lets go sooner in a hard lean. Soft ice yields: the blade sinks on its own and even a moderate hollow bites.

The rule follows directly. **On hard ice, go deeper** — the steeper bite angle restores the grip the surface is refusing. **On soft ice, go shallower** — penetration is already free, and a deep hollow only plows, slows the glide, and burns the legs.

Rink ice has numbers attached to it. Wissota, a sharpener manufacturer, puts hard hockey ice at 17 to 23 degrees Fahrenheit, with most rinks targeting about 25 degrees. No published source goes further — nobody credible states a hollow change per degree — so the rule stays one step, not a formula.

The classic presentation is a player who skates well all week and then loses his edge in really tight turns at a weekend tournament on colder, harder ice. Nothing about the player changed. The forces in a tight turn are the highest a skater produces, so it is in tight turns that a marginal edge lets go first — and hard ice is where a marginal edge is exposed. The worked example on page 9 is exactly this case.

The practical conclusion is restraint. A family cannot re-cut skates for every rink, and chasing conditions weekly teaches a young player nothing except that his equipment is always in question. Choose the cut for the ice the player skates most, in the order: weight first, home ice second, preference last. Older competitive players sometimes carry a second set of steel cut one step deeper for hard-ice tournaments; for a minor hockey player, one well-chosen cut and sharp, level edges cover the same ground.

THE STYLE CHANGE

How the modern game changed the hollow

Every page so far treats the hollow as a choice about a skater. It is also a choice about an era. The skating of thirty years ago was mostly straight lines: forwards travelled north–south, defencemen backed in on straight backward strides, and a large share of every shift was plain gliding. A game skated that way asks an edge mainly to glide and, now and then, to hold a turn. The famous shallow cuts of that era — Coffey at one to two inches above all — belong to that game.

The modern game is skated differently, and the difference has been counted. In GRIT's five-game study of NHL play, defencemen's true backward skating — sustained backward strides as a way of defending — measured 0.8 percent of observations, and forwards registered none at all. Defencemen now surf and angle, pivoting constantly between forward and backward. Acceleration itself has moved onto edges: Joe Quinn, Connor McDavid's skating coach, describes his player travelling “120 feet of zero strides, 100 per cent crossovers,” and crossovers are now taught as a way to travel and accelerate, not merely to turn. Open-hip movement is in the national under-9 curriculum. The modern stride is a long series of edge events — crossovers, Mohawks, punch turns, escapes — with relatively little flat gliding between them.

That skating asks two opposite things of an edge in the same shift. In the turn, at full lean, the edge must hold. In the transition that follows a second later, the same edge must release — a transition is a rotation of a loaded blade, and a blade that is grabbing cannot rotate. Too little bite fails the turn. Too much bite fails the transition: the edge catches, the move comes out in segments, and technical transitional skating — the skill family the modern game is built on — becomes difficult on the very equipment meant to secure it. This, more than any fashion, is why the middle of the ladder is crowded now, and why a system offering bite on demand without drag between edge events (page 9) found its audience in professional rooms.

“Too little bite fails the turn. Too much bite fails the transition. The right hollow today holds the turn and still lets the blade pivot.”

One limit belongs on this page rather than in the caveats. No record of hollows across eras exists, so no one can honestly state that the average cut deepened or shallowed by a measured amount. What is documented is the style change itself — counted in GRIT's game studies and described by the coaches teaching it. The hollow argument follows from that, and from the mechanics of what the new style requires.

THE SECOND SYSTEM

Flat Bottom V: the alternative geometry

A different shape for the bottom of the blade — and a different set of numbers.

Blackstone's Flat Bottom V (FBV) replaces the continuous round groove with a shallow **flat channel** ground between the two edges. In a round hollow, a deeper cut bites because more of the blade's arc is buried in the ice — and that buried arc is also what drags. A flat channel puts less steel in the ice while gliding and keeps the edges aggressive, so the glide behaves like a shallower cut and the bite like a deeper one. Read the claim precisely: FBV **softens** the trade-off on page 4; it does not repeal it. The edges still penetrate, penetration still costs drag, and how much bite to buy remains the player's choice.

FBV cuts are named with **two numbers**: the first tracks glide, the second tracks bite. There is no exact traditional equivalent. The manufacturer publishes only three reference points; the fuller chart comes from a dealer — and on one cut the two disagree outright, so the table prints both.

FBV cut	Blackstone (the maker)	Dealer chart (No-Icing Sports)
100/75	edge of a 3/8" to 1/2" hollow	not listed
100/50	not published	about 1/2" to 9/16" — most bite in the line
92/75 · 90/1	not published	bite of about 9/16" to 5/8"
90/75	edge of a 5/8" to 3/4" hollow	about 5/8" to 3/4" — the two agree
90/50	the 1" hollow	about 3/4" to 7/8" — conflicts with the maker
80/50	not published	about 7/8" to 1" — most glide in the line

Blackstone's figures are from the manufacturer's own FBV page; the dealer chart is a high-volume FBV shop's. Neither is a conversion — they orient a skater moving between systems. Where this report needed one number, it followed the maker. See caveat 2, page 11.

The costs are real and should be stated plainly. FBV users and sharpeners report that when an FBV edge goes, it can go all at once rather than fading gradually — a lost edge can end a session unless a spare set of steel is in the bag. Availability is a genuine constraint: FBV requires the correct equipment and dressing, which not every shop has.

A worked example, from this season. A 75-pound U11 AAA player skates on FBV 90/75 and skates well — except on hard ice, where he loses his edge in really tight turns. His weight cannot supply the bite, and hard ice in a tight turn is where the forces peak. The correction is one step: 92/75, a single rung deeper in bite. Not two rungs to 100/50 — a jump that size changes the feel of every stride to fix a problem that appears in one manoeuvre.

Our own experience with FBV. I have skated on flat-bottom cuts for two years, and I do not see myself going back. I have found limited to no downside. I switched my son, a U11 AAA player, just under a year ago: he holds a strong edge, and he works less hard to find his glide. Just our experience.

THE EXECUTION

A good sharpening matters more than the number

A hollow is a specification. A sharpening is a piece of work. Players feel the work.

Level edges come first. The geometry on page 3 assumes both edges stand at the same height. If one edge is higher, the skate favours it: one edge grips while the other skates on its side, and the player reports that the skates feel “off” — slippery one way, grabby the other. It presents exactly like a wrong hollow, and no change of hollow fixes it. Competent shops verify edge level with an edge checker after sharpening. As one sharpening authority puts it: a perfect number with uneven edges feels worse than a wrong number done right.

Finish comes second. Grinding leaves a burr along the edges. A burred edge feels aggressively sharp in the shop and folds on the ice; proper honing removes the burr and leaves a clean, durable edge. Two sharpenings at the same hollow, from two shops, are not the same product if one is levelled and honed and the other is neither.

Frequency is the third variable, and published guidance honestly disagrees. Recommendations run from every 2–3 hours of ice (Bauer's sharpening guidance) to every 10–20 hours (general published guidance), with competitive shops suggesting roughly 6–8 hours for their players. Every figure at the frequent end comes from a company that sells sharpeners or sharpening. There is no settled standard, and the calendar is the weakest guide in any case. The reliable signals are symptoms:

- Slipping during starts, turns, or pushes that were secure last week.
- One skate feeling different from the other.
- Visible nicks, rust, or a blade that no longer feels consistent from heel to toe.
- Any contact with concrete, a goal post, or another hard surface — damage can end an edge in one shift, whatever the calendar says.

Between sharpenings, care is simple and decides how long an edge lives: dry the blades after every skate, store them in soft guards, walk only in hard guards, and never leave steel bare against concrete or tile. Most “my hollow stopped working” reports are an edge that was damaged or dulled off the ice.

READ BEFORE YOU DECIDE

The caveats, in big print

WHAT THIS REPORT CAN AND CANNOT CLAIM

- 1. One controlled study exists — and it measured a course, not a game.** At the University of Calgary, Federolf and Redmond (2010) measured blade friction on a weighted sled and timed 15 players through an agility course on different hollows, without telling them which cut they were on. Friction rose as the hollow deepened — 11 percent lower at 1/2 inch and 19 percent lower at 3/4 inch than at 1/4 inch. Course times were hurt only by an extremely deep 1/8-inch hollow; between 3/8 and 7/8 inch, the best cut differed by player, and players could not identify their hollow — though the cut they rated most comfortable was usually their fastest. No research measures hollow choice in game performance. The rest of this report rests on geometry, which is exact; the physics of penetration and drag, which those friction measurements support; and manufacturer guidance and shop practice, which are accumulated experience rather than measurement.
- 2. FBV equivalents come from two charts that disagree.** Blackstone publishes only three reference points; the fuller chart on page 9 is a dealer's. On 90/50 they conflict outright — the maker says the 1-inch hollow, the dealer chart says 3/4 to 7/8 inch — so page 9 prints both. Where a single number was needed, this report followed the maker.
- 3. The geometry assumes standard steel.** Groove depths and bite angles are computed for standard 2.9 mm hockey steel. Wider steel changes the numbers more than a little: on older 4 mm goalie steel, a 1/2-inch hollow is nearly twice as deep as the table on page 3 shows. Modern goalie steel, about 3 mm, sits close to the table. The direction of every recommendation is unaffected.
- 4. This report covers the hollow only.** Blade profile (the rocker along the blade's length), boot stiffness, and steel quality also change how a skate feels. A player fighting his skates may have a profile or fit problem wearing a hollow's clothing. Change one variable at a time.
- 5. Feel is the final test, and it is a real test.** Two players of the same weight can settle one step apart. The method in this report finds the right neighbourhood; only skating on the cut settles the exact step.

Sources consulted include Blackstone Sports' FBV page; Sparx Hockey's radius-of-hollow guidance; ProSharp's published FAQ; Wissota's sharpening guidance; The Sharpening Dude's Sharpening 101 (geometry cross-check); Tydan Performance Blades' sharpening guidance; and Federolf and Redmond's 2010 study in Sports Engineering (University of Calgary). Where sources conflicted, the conflict is stated in the text rather than resolved silently.

THE APPLICATION

What this means for your player

The hollow is the cheapest performance decision in hockey. It costs one sharpening to test and one step to correct. Treat it as a setting to be tuned — not a number to be inherited from a teammate, a sibling, or a shop's default.

Start from the chart on page 6, not from what anyone else uses. Weight sets the neighbourhood, skill sets the step within it: for most minor hockey players the working range is 7/16 to 5/8 inch in a traditional cut. In FBV, start in the matching neighbourhood on page 9.

Change one step at a time, then judge honestly. One step is 1/16 inch of radius, or one rung in FBV. Judge the change over at least two or three skates — practices and a game, with turns and stops at full speed — not on the first lap of the first warm-up, when every fresh sharpening feels different.

Read the symptoms in the right direction. A light player losing edges in tight turns, especially on hard ice, with edges fresh and level: one step deeper. A bigger or more powerful player washing out: check load, level, and dullness first — his problem is rarely depth, and a deeper cut will more likely make his skating worse. Transitions feeling sticky, stops chattering, turns coming out in pieces: that is too much bite — one step shallower. Legs burning and the skates feeling stuck in soft ice: one step shallower. One skate feeling different from the other: that is not a hollow problem — ask for an edge level check before changing anything.

Ask your shop two questions. “What hollow are you putting on?” and “Do you check that the edges are level?” A shop that can answer both is a partner in the process. A shop that can answer neither is an uncontrolled variable in your player's equipment.

Keep the edge alive between sharpenings. Dry blades, soft guards for storage, hard guards for walking, and a sharpening when the symptoms on page 10 appear — not by the calendar alone.

Recheck when the player grows. Weight is the main input, and minor hockey players change it constantly. A growth spurt is a sharpening appointment: same skates, new arithmetic.

Get the neighbourhood right, keep the edges level and alive, and the skates stop being a question. That is all a hollow can do for a young player — and it is not a small thing.

GRIT Hockey — Modern Hockey Training and the Ultimate School Experience for grades 4–8 kids.

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