NORDIC ULTRATUNE UPDATE

News & Notes from NORDIC ULTRATUNE

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March 2007 *Volume 9, Number 4*

Movin' on up!

The calendar says it's getting late in the ski season, but you wouldn't know it by looking out the window. We've still got a few feet of snow in the yard, and got a fresh 6 inches this past weekend. The end of ski season sure doesn't seem near at all. But already I've got news for the upcoming summer season, and more news for next winter's season.

Nordic Ultratune will be moving half a block down the street this summer to a new, bigger, brighter location. If you're familiar with downtown Winthrop, we're moving to the old Trail's End Bookstore location. The new location will have real daylight, better ventilation, better access, and will have more space for additional skis, tools, wax and supplies. In the spring/summer newsletter, I'll have more info and photos from the move.

Additionally, I'm happy to report that Ultratune will be adding the new Madshus Nanosonic Highspeed Carbon skate and classic skis for the 07/08 season. I've been testing the new Nanosonic models through February, working closely with Peter Hale of Madshus, and I'm really excited about the performance and quality of these new skis.

In the newsletter you can find reviews of the all-new Rossignol Xium Carbon skate skis, and the new Madshus Nanosonic Highspeed Carbon skis, too.

-Mark Waechter

Schedule Stuff

Nordic Ultratune is on a normal winter schedule until spring begins in late March.

Regular winter hours are Thurs, Fri, Sat, Sun, Mon, 11-5. Stop in and say hello! Most days I'm in the shop earlier, but those hours are a sure thing. Usually Tuesday and Wednesday of every week are reserved for ski testing and a little time off.

Testing new Madshus skis at Ultratune.

Methow Valley Juniors to JO's

Best of luck to local junior skiers Erik Bjornsen, Jamie Devin, Brian Jensen, Casey Kutz, and Tannis Thorlakson, all of them heading for JO's in early March at Soldier Hollow. Also, Sadie Bjornsen will be racing in the (delayed) Jr Worlds in Italy! ***Go get 'em!***

The Madshus Nanosonic Highspeed

A new name, bold graphics, and lots of red.

Peter Hale from Madshus has been a friend for years, and this winter Peter has been in touch frequently. A few weeks ago he sent a few pairs of the not-yet-released Madshus Nanosonic Highspeed Carbon skate and classic skis for testing.

I've spent much of the month of February testing new 07/08 skis. It's tough work, but someone's gotta do it. Testing has included time on the snow, time on the flex bench measuring and comparing skis, and time spent grinding and tuning the skis.

The new Nanosonic is really an evolution of the Hypersonic, but since this year's developments are big – more than a minor incremental improvement – Madshus decided that it was the right time to give the ski a new name.

The big change in the Nanosonic is a new carbon triaxial braided fiber material, and a new core material that won't absorb resin and thus saves weight. Madshus says the skis will be 500 grams per ski, which puts it in the "very light" category. My tests at Ultratune weighed in slightly higher, but still very light.

The Madshus skis have the NIS plate on all the models. That seems to be a no-brainer. Binding positioning affects ski speed, and optimizing binding position helps optimize ski speed. NIS does that. Enough said.

Yes, it's got some visible carbon weave which seems to be mandatory in the 21st century. Yes, it's got a big bold Madshus label. Yes it's true, it's a Nordic ski that's actually made in Norway.

The skate skis I tested carefully on the flex bench were extremely well matched (i.e. both skis in a pair are "the same"). Also, Madshus has done a great job preparing the bases – they're flat and easy to tune. The factory structure is still a bit too coarse – in my opinion – for racing in most conditions, but a grind will make them race ready.

Nanosonic Skate Skis
The Nanosonic skate skis are available in three versions:

- The "SC", which Madshus calls as soft-conditions ski, but which I think is a great all-arounder. It has less side-cut (44-43-44) and feels really good under foot.
- The "R", or regular, is the all-around version of the Nanosonic skate ski, with a 44-40-44 side cut that handles well in a broad range of temps.
- The "HP", or hard-pack, version has a stiffer tip. It has the 44-40-44 sidecut and although it has a stiffer forebody, it's often the all-around pick for skiers over 160 pounds or in areas where hardpacked skiing is the norm.

I asked Peter Hale which ski the World Cup skiers are using, he replied, "It depends!" Apparently there are some who ski only on the hardpack and "regular" models (with the sidecut), and others who ski solely on the SC.

For years I've been a fan of the "HP" skate skis, finding them to be a great all-around ski for a heavier skiers (full disclosure: I'm 6'3" and around 190 lbs). To me the real surprise in my testing was the SC, which I thought was a real treat to ski on in conditions ranging from soft new snow to very firm conditions. I tested on a 195cm with reserve camber of about 0.25mm, and flattening at about 108% of body weight. I thought this ski really handled nicely and is particularly smooth at rolling edge to edge. Anyone who uses the outside edge of the ski with a V2 or V2-alt will really like the way this ski rides.

Nanosonic Classic Skis
I like the "plus" version of the classic ski. It has a little bit higher and more active camber. Fit, of course, is the key to getting a ski that kicks well. A well-fit ski of this version kicks nicely and will have room for a bit of klister, so it'll make a great all-around classic ski. The bit of sidecut, and a not-too-soft tip make this ski a good handler on the descents, too. Like the skate skis, the Madshus classic skis are really nicely matched, ski-to-ski, so good pairs are the norm.

Availability
Ultratune will be getting the Nanosonic skate & classic skis in September. If you'd like a pair hand-picked for you, drop me a line.

The All-New Rossignol Xium Carbon

Rossignol has an all-new Xium skate ski for the 07/08 season. Cosmetics are noticeably different of course, but that's just nice window dressing. The ski is a different design and that's worth a closer look.

A few weeks ago 35 pairs of the 07/08 skis arrived for tuning for the Rossignol Nordic Racing elite squad. I think it's safe to say that I've spent more time working with the new skis than just about anyone in North America at this point, and I've spent a fair bit of time skiing on them, too.

For starters, the new ski is a cap ski. It has a full cap and no longer has the hard side-panels of the old Xium. Along with the cap fabrication comes the flanged base edge, similar to what is found on an Atomic skate ski – it's pretty pronounced.

The ski also has a full carbon deck under the surface, and you'll find a noticeable hump running along the centerline of the ski; it's about an inch wide. And the ski has gone on a diet – it's lighter and thinner, shaving a millimeter or so in width along its length.

Skiing it… The changes in performance are noticeable - the forebody of the ski is a bit more compliant. Margaret, my wife and captain of Ultratune's "small sizes ski testing department", says that the change is definitely a bonus in the 181cm skis that she tested. Personally, I felt like the skis that I tested were a bit easier to handle on the downhills, and clearly had more edge on firm and icy conditions.

What's stayed the same? The general camber concept remains unchanged – it still has a relatively high and active bridge. The fitting remains largely unchanged; half-weight camber length and camber height measurements are about the same, and reserve camber at 100% body weight is about the same in relationship to sizing. Also pressure-to-close in relation to body weight is still the same. Consideration of the more compliant forebody will be important in fitting the ski.

NIS? Yes. Of course. The Xiums will all have the NIS binding plate for the 07/08 season.

Also the reinforced tip/tail sections, incorporated into the Xiums from the past couple of years, is still part of the ski (clearly visible in the photo).

A new Xium on the test bench

Changes to the classic skis?
The Xium classic skis change only in the graphics for the 07/08 season. The C2 classic skis are such a hit that I'm very happy that there aren't any changes to it.

Availability?
In fact we have some in stock right now if you're interested. The price, including stone grind of your choice and hotbox service is $479.

Sept 07 Ski Picks
Ultratune will continue to offer flex fit, hand picked skis for the 07/08 season. So far (end of Feb), we've already got orders for a fair number of our pre-season skis. If you'd like some, let me know! xcgrind@ultratune.net

The hand picked ski program works like this: You send me a note letting me know what you want; I'll need some size and weight info, along with information on preferences. Boot size helps, too. In September when the skis arrive, I pick skis, then I'll contact you for grind info and payment. They'll be stone ground, hotboxed, bindings mounted, etc, and shipped to you before the snow flies.

Respiratory Muscle Training
Part 4: Summary & Food for Thought
By Margaret Waechter, M.S.

About the author:
Margaret Waechter has an M.S. in Exercise Science, and is an ACSM Registered Clinical Exercise Physiologist®. She does exercise testing for athletes at Winthrop Physical Therapy in Winthrop, WA, and coaches Nordic skiers and cyclists. In addition, she does rehab and diagnostic testing with cardiac patients at Methow Valley Family Practice. No stranger to elite XC-Skiing, Margaret was a Canadian National Cross Country Ski Team member in the 1980's.

Ed Note: This is the final part of a 4 article series.

This is the final article in a series of reviews of respiratory exercise physiology. The first article outlined in simple terms how respiration works during exercise and the mechanisms behind Respiratory Muscle Training (RMT). The second article reviewed several RMT devices, and how they can and have been used to improve performance. The third article presented information on exercise-induced arterial hypoxaemia in athletes (EIAH).

There is little to no practical advice available for athletes who wish to use our current knowledge of respiratory exercise physiology, pulmonary function and VO_{2max} testing information to adjust training regimes for performance improvement. I have been digging around in the literature looking for suggestions for athletes, and will present some ideas for discussion and future research. I hope I have provided some "food for thought" in writing these articles.

Respiratory Muscle Training

RMT may improve performance. The body of research information and studies performed are limited, but the evidence suggests that RMT does indeed enhance endurance exercise performance. It is also clear that more extensive research using larger numbers of good endurance athletes still needs to be completed. Animal studies completed to date suggests that RMT triggers increased amounts of aerobic enzymes in the muscles of breathing allowing more efficient energy utilization within respiratory muscles and decreased fatigability of these muscles. It increases V_T (tidal volume) and maximal V_E (minute ventilation) while decreasing respiratory rate, allowing athletes to perform more work while breathing fewer times (Amonette & Dupler, 2002). RMT appears to decrease the effort of breathing, decrease inspiratory muscle fatigue, decrease lactate turnover, and possibly decrease heart rate by 3-5 bpm. RMT does **no**t change VO_{2max}, or maximum lactate steady state (Markov, Spengler, Knöpfli-Lenzin, Stuessi, Boutellier, 2001; McConnell & Sharpe, 2005).

Overall, respiratory muscle training translates into large improvements in submaximal exercise performance and more modest 1.8-4.7% performance improvements in harder time trial efforts (Holm, Sattler, Fregosi, 2004; Sheel, 2002). I'll take that performance improvement please, as I get ready for the Master's World Cup in McCall, Idaho next year!

What Should I Use?

The use of a Spirotiger® seems to provide a range of respiratory system adaptations that may improve performance. I am not linked at all to this company, but am simply reviewing the available data. These include improved inter and intra-muscular coordination of the muscles of breathing, improvements in economy moving air, effective warm-up prior to racing, and intermittent hypoxic training at rest and with the addition of motion. There is currently a lot of research in regards to hypoxic training. Should we live high - train high, live high – train low, live high –train low with supplemental O_2, use intermittent hypoxic training at rest or with motion. In this case one lives low, but undertakes periodic hypoxic training by using commercially available system to decrease O_2 during exercise, or driving to altitude to train. Hmmmm. Let's look at this very quickly.

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Hypoxia can influence changes in the cardiovascular system, muscles, respiratory system, and central nervous system. A major goal of altitude training is to increase the total volume of red blood cell mass, as well as changes in respiration and blood lactate accumulation (Rusko, 2003). However, altitude training may introduce some negative effects on certain performance determinants, masking the positive effects of increased arterial blood oxygen carrying capacity. We know that mechanical, neuromuscular and chemical stimuli all induce training effects in endurance athletes, and neuromuscular and anaerobic characteristics that positively influence endurance performance may be adversely affected by altitude training. There may be a central governor or controlled link between cardiac function and muscle performance. During maximal exercise in hypoxic conditions the electrical activity of muscles as well as cardiac output are attenuated, suggesting that the central nervous system plays a role in limiting exercise performance.

Over the past few years variations to the old live hi/train hi approach we used in the 1980's to get ready for world championships are being explored. The Spirotiger® may have a role here in providing intermittent hypoxic training, including improved buffering capacities, and improved ventilatory parameters while allowing the athlete to complete the high velocity training necessary to improve central adaptations that can optimize neuromuscular performance and anaerobic power and capacity. Athletes looking for a good, l**egal** training tool to boost performance and aid adaptation to altitude could consider using the Spirotiger®. Please contact Spirotiger® for more research and specific protocols to use when training for different events or contact Juerg Feldman at Fact Canada (http://www.fact-canada.com).

EIAH (Exercise Induced Arterial Hypoxemia)

To review previous information, EIAH is said to exist when the arterial partial pressure of oxygen (PaO_2) is reduced by 10 mmHg during exercise, or arteriolar oxygen saturation levels (SaO_2), measured non-invasively with a pulse oximeter,

persistently drop more than 4% from baseline values in an incremental progressive exercise test (Prefaut, Durand, Mucci, & Caillaud, 2000). Other studies have defined EIAH as an exercise SaO_2 < 91% (Dempsey & Wagner, 1999).

Does EIAH Impact Performance?

Many highly trained endurance athletes exhibit EIAH that appears to indicate problems in gas exchange. Athletes who exhibited significant reductions in SaO_2 at sea level (3-9%) showed decreases in VO_{2max} of 1% per 1% drop in SaO_2, while work output was reduced about 5% in highly trained cyclists who de-saturated below 87%. Romer and Dempsey (2005) suggest that exercise-induced oxygen de-saturation does negatively impact performance in part due to fatigue in the muscles of locomotion.

What Can I do to Mitigate EIAH?

We also know that SaO_2 decreases at altitude. A 1% drop in SaO_2 below 95% corresponds to a 1-2% drop in VO_{2max}. At altitude athletes train at lower VO_{2max}, and lower maximal sustained and interval training velocities. SaO_2 values also are lower during submaximal exercise, and

Subjects experimenting with hyperoxic training (60% O_2)

submaximal exercise velocities are also therefore lower. This negatively impacts central nervous system function and therefore neuromuscular function and anaerobic ability. I was not able to find research looking at central nervous system

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functioning and cardiovascular function and exercise performance in athletes

exhibiting EIAH, but it would be an intriguing research project….if supplemental O_2 is used to prevent EIAH average VO_{2max} values increase significantly, the absolute level and rate of rise of arterial blood lactate was reduced, the rate of rise of effort perception was reduced, and force output of locomotor muscles increased (Romer & Dempsey, 2005). Could supplemental O_2 be used with great effectiveness during training and high intensity intervals to increase mechanical and neuromuscular stimuli and therefore performance velocities in this subset of athletes who exhibit EIAH? It has already been used in live high, train high with supplemental O_2 models. In the future I can see endurance athletes using portable NIRS units that measure total tissue oxygen saturation, alongside supplemental O_2 to monitor high intensity interval sessions. Secondly, the use of antihistamines to mediate the inflammatory response that may cause diffusion limitations would be interesting research in this subset of athletes. Finally, one recent research project found that polyunsaturated fatty acid administration (a six week PUFA diet) could mitigate oxygen diffusion limitations, and significantly lower EIAH at maximal exercise (Aguilaniu, Flore, Perrault, Page, Payan, & Lacour, 1995). Clearly optimizing diet and health status will improve lung function.

Since age potentiates EIAH, and athletes with higher training volumes also have a higher incidence of EIAH, both master's and elite athletes should pay attention to pulmonary function (Prefaut et al., 2000). Studies should be conducted to determine to optimal high intensity exercise regimes for masters and elite athletes. At this point common sense should prevail. Back to back intensity sessions or "blocks" of high intensity intervals should be conducted under supervision and with caution. Will the performance improvements due to improvements in cardiac output be attenuated by impairments in pulmonary function, particularly in those athletes who demonstrate EIAH? Perhaps we should be more judicious in the timing of intensity sessions in this subset of athletes, and look at the effect of repeated intensity sessions on diffusion across the alveolar membrane.

Aguilaniu, B., Flore, P., Perrault, H., Page, J. E., Payan, E., & Lacour, J. R. (1995). Exercise-induced hypoxaemia in master athletes: effects of polyunsaturated fatty acid diet. European Journal of Applied Physiology, 72(1-2).

Amonette, W. E., Dupler, T. L. (2002). The effects of respiratory muscle training on VO2max, the ventilatory threshold and pulmonary function. Journal of Exercise Physiology online, 5(2), 29-35.

Dempsey, J. A., Wagner, P. D. (1999). Exercise-induced arterial hypoxemia. Journal of Applied Physiology, 87(6), 1997-2005.

Holm, P., Sattler, A., & Fregosi, R. (2004) Endurance training of respiratory muscles improves cycling performance in fit young cyclists. BioMed Central Physiology, http://www.biomedcentral.com/1472-6793/4/9.

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McConnell, A.K., & Sharpe, G. R. (2005).The effect of inspiratory muscle training upon maximum lactate steady state and blood concentration. European Journal of Applied Physiology, 94(3), 277-84.

Prefaut, C., Durand, F., Mucci, P., & Caillaud, C. (2000). Exercise-induced arterial hypoxia in athletes. Sports Medicine, 30(1), 47-61.

Romer, L. M. Dempsey, J. A. (2005) effects of exercise-induced arterial hypoxemia on limb muscle fatigue and performance. Proceedings of the Australian Physiological Sociey, 36, 71-75.

Feldman, J. (2006). http://www.fact-canada.com/. October 25.

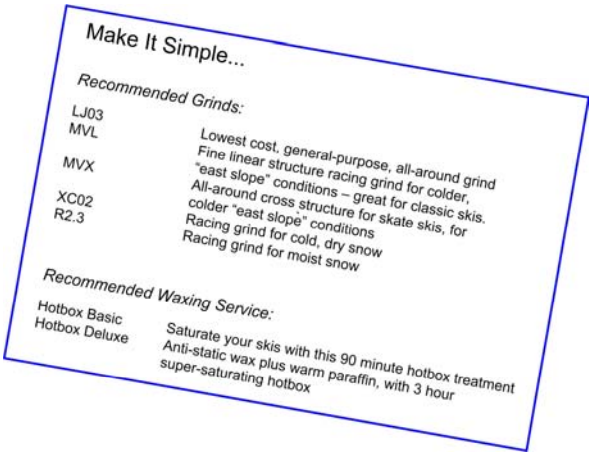
Rusko, H. (2003). Cross Country Skiing. Malden, Massachusetts: Blackwell Science Ltd.

Sheel, A. W. (2002). Respiratory muscle training in healthy individuals: physiological rationale and implications for exercise performance. Sports Medicine, 32(9), 567-581.

Rossignol Boots on Sale

Ultratune has Rossignol World Cup Skate and Classic boots in stock in regular and “low volume” versions. I’m closing out the 06/07 version (the color will change for 07/08), and prices are sharply reduced on existing stock. Email or call for information.

A ski trail in Mazama, WA.



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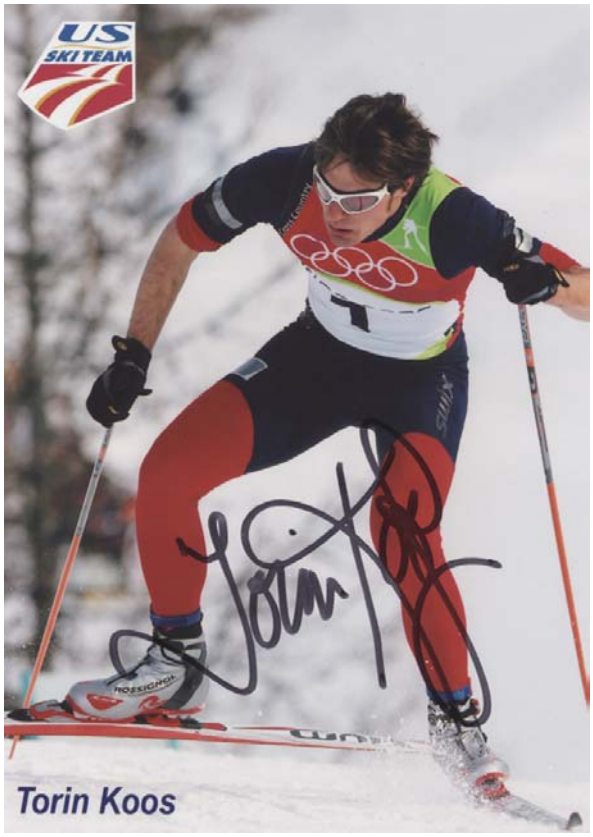


Congratulations to Torin on his World Cup Podium!

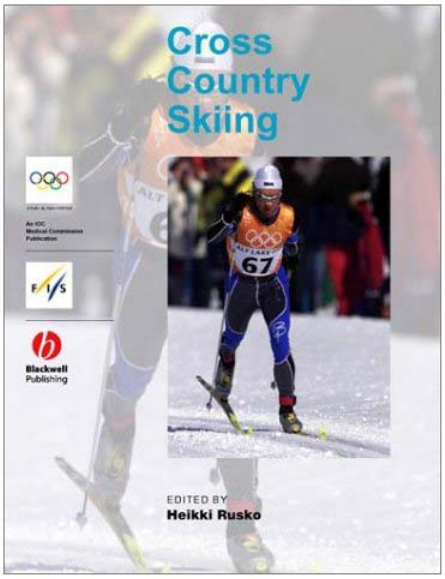
A Book Review:
Cross Country Skiing
Edited by Heikki Rusko

(Reviewed by Margaret Waechter)

Cross Country Skiing
Edited by Heikki Rusko, Blackwell Publishing

I came across this book at the World Cup held in Vernon, British Columbia in December of 2005. Mark was working with the Slovenian Team and I was on the mountain as well, visiting old friends and watching the action. During a few evenings Mark and I sat down with Marko Gracer, the Slovenian Team coach, for a glass of wine and chit-chat. I had noticed that several of his team members were reading *Cross Country Skiing* (in English, I might add), and asked about the book.

Coach Marko said he asked all his athletes to read it, and educate themselves. I immediately procured a copy for myself when I returned home, ordering it from Amazon.com!



This book is published by Blackwell Publishing. It is endorsed by the FIS and is an IOC Medical Commission Publication. This is a great book for anyone with some knowledge of skiing, who wants to learn more. Included are sections on endurance sport physiology, biomechanics of skiing, medical management, training for skiing, altitude training, nutrition, and psychological factors in cross country skiing, and coaching issues. It covers the gauntlet in 189 jam-packed pages.

This text covers a wide array of research in the field, presented at a level that coaches and athletes without formal physiology education can understand. Instead of just publishing personal opinions as many coaching texts do, this book reviews research findings by leading researchers in the field. This is information that means something to me!

Although it was published in 2003, it is still a pretty comprehensive guide for training in 2007.

One of our goals as coaches and physiologists should be to help athletes make independent and knowledgeable choices about preparation for racing.

This book should be required reading for bright older juniors, senior and master athletes, and aspiring coaches who want to understand more of the science behind their sport. What does it take to be a good skier? How do we test athletes? What should we test? And how do we train to win? *Cross Country Skiing* addresses these questions and will provide hours of good reading.

Yes, those are 07/08 Xiums at Ultratune!!

Grind Research

The Rossignol Elite Team asked for some special grinds while I was at West Yellowstone in November, and work began immediately to meet their requests. The opportunity to get feedback and testing from skiers at the highest level is terrific and isn't being wasted.

One of the "prototype" grinds, so far called nothing fancier than "grind 615b" found its way to the podium at Senior Nationals in January. A few weeks ago, when Rossignol sent 35 pairs of their brand new orange Xiums for tuning, they requested the 615b on all of them! I guess it's a keeper.

Happy Birthday to Margaret!

Another "special request" was a super-cold conditions grind. I had plenty of opportunities to test some candidates here at home in the Methow Valley, and the best version went to Clarke Sullivan, the ski serviceman for Rossignol Nordic Racing. He's reported that the extra-cold grind saw a lot of service in the Midwest during their January/February deep-freeze, and that the few pairs he had were in high demand.

These two new grinds will likely be available to the consumer for the 07/08 season. As weather conditions allow, further testing will be done as "process validation", and to make sure that the data is repeatable.

Names for the new grinds? Yikes. The extra cold grind will very likely be named the XC01, since it shares a lot of the concept with the XC02 (strict naming rules, as laid down by Nat Brown would be violated, but he can sue me later…). The "615b" is more of a mystery grind, and naming that may take some creativity, or else it'll simply remain the 615b.

Other grind news…
Rossignol Nordic Racing reports that Josh Smullin won the Owl Creek Supertour race on an MVX… …and MVX was running well for the Birkie Elite sprints as well.

----- Original Message -----
From: "Katherine L. Pearson"
To: ""Nordic Ultratune""
Sent: Monday, February 12, 2007 12:59 PM
Subject: Thank you

Hello-
You recently ground two pairs of skis for me. I've been testing the skate skis ground with LJ02 and really like them. Yesterday I went for a long distance ski with a big group of competitive racers. My skis were considerably faster than anyone in the group and allowed me to pass on every downhill! I really appreciate your help and willingness to sponsor the Rossignol Elite Team.
Thanks,
Kate

----- Original Message -----
From: "Diane Tremblay"
To: "Nordic Ultratune"
Sent: Tuesday, February 06, 2007 4:35 PM
Subject: Re: congrats...

Mark - the skis are working out great as usual.
Thanks-di

----- Original Message -----
From: "Susanne Margol"
To: xcgrind@ultratune.net
Sent: Monday, January 29, 2007 8:27 AM
Subject: Thanks!

Hi Mark,
Well you were right ..... I love my new Rossi's! They glide beautifully and they are fast. Thanks for recommending these and for tuning them overnight -- you're the best! Brian is also thrilled as now he doesn't have to listen to me whine about my skis every single time we classic ski.
Have a great day and see you next time we're in Winthrop. Susanne

---

Notes From Our Friends

----- Original Message -----
Subject: hi
From: "casey kutz"
Date: Sun, January 28, 2007 3:53 pm
To: "Nordic Ultratune"

Hey Mark,
I wanted to tell you about how my skis kicked ass in Utah. I was going to come in and tell you about them a few days ago but then i got the stomache flu and that's why i didn't go to bend, but anyways...the skis were awsome.
I especially noticed it on my classic skis becuase they saved my butt majorly. In my last heat (the B finals) i was in last place going up the hills because i was so tired, but i caught up on the downhill and ended up getting second! (in the heat) it was pretty cool. The skate skis were also really fast, it was kinda funny having to worry about being behind someone on a downhill becuase i was afraid i was going to run into them! (theres this one really long downhill with a sharp turn and i was scared to death) but yeah, it was really fun racing, and i just wanted to say thanks!
~Casey

----- Original Message -----
From: "Jana Thomas"
To: "Nordic Ultratune"
Sent: Wednesday, February 07, 2007 4:01
Subject: RE: Skis...

HI Mark,

Better than new was right!! Thank you so much for turning them around so quickly they were so amazingly fast after visiting you, thank you so much!
Jana

NORDIC ULTRATUNE

2006-07 WORK ORDER FORM & PRICE LIST

(Please attach one copy of this form to each pair of skis)

INSTRUCTIONS:

- Please: we must have a *fully completed* order form to begin work on your skis!
- A personal check, money order, or charge card info (Visa/Mastercard) **must** accompany your skis. We will not begin work until payment is received.
- Remove all wax from skis - there will be a $5.00 surcharge for removing wax from skis.
- Tie skis together with rubber bands or tape - ski ties will not be returned.
- Fold this form and tape it to your skis. One work order form per pair.
- No styrofoam "peanuts"!

SHIP SKIS TO:

NORDIC ULTRATUNE
177 Riverside Ave
Winthrop, WA 98862

		Prices in US$
Grinds (all grinds include travel wax):		
LJ03	- general purpose "all around" grind	$ 64.00
MVX	- layered cross-structure for skate skis in colder "east slope" conditions	$ 64.00
MVL	- general purpose linear grind for classic skis in colder "east slope" conditions	$ 64.00
XC02	- for cold & dry snow; linear grind with a secondary polishing stage	$ 76.00
XC03	- versatile linear grind with secondary polishing stage	$ 76.00
R2.3, R3.3	- for coarse, transformed snow, high humidity – 3-stage compound grind	$ 88.00
Waxing (add to the above price):		
Hot Box Basic	- paraffin wax with 90 minute hotbox soak	$ 15.00
Hot Box Deluxe	- anti-static treatment followed by paraffin wax & 3 hour hotbox soak	$ 25.00
Additional Services (add to the above price):		
Binding Installation	(specify boot size_____)	$ 12.00
Ultratune Flex Analysis		$ 15.00
Rush order and overnight shipping (please call in advance)		$ 35.00
	Subtotal:	$_____
	Washington residents add 7.6% sales tax:	$_____
Packaging, Shipping & Insurance: $20.00 first pair, $10.00 subsequent pairs		$_____
	Total:	**$_____**

SHIPPING ADDRESS

NAME
ADDRESS
APT / SUITE
CITY
STATE ZIP

TELEPHONE ( )
EMAIL

CHARGE CARD PAYMENT INFORMATION

NAME ON CARD
VISA / M.C. EXP /
SIGNATURE _____

SKI INFO

BRAND
LAST 4 DIGITS OF SERIAL NUMBER
SKATE CLASSIC

SKIER INFO FOR FLEX ANALYSIS

SKIER HEIGHT WEIGHT

NOTES