



DAVID S. MULDER, MD
PRESIDENT 1984–1985

DR. FREDERICK A. LUCHETTE

What made you decide to choose a career in surgery and then, secondly, your decision to be involved with trauma surgery?

DR. DAVID S. MULDER

Well, I guess my decision came during a general surgery residency at the Montreal General Hospital. I had never even thought about trauma. It probably wasn't even in existence then as a career choice.

I was recruited to come to Montreal for my residency by Dr. H. Rocke Robertson, who was a post-military surgeon. He served in the Second World War for the Canadian Armed Forces and while he was there became concerned about the care that injured soldiers were receiving. I guess when he wasn't busy patching people up, he wrote a treatise on what I would say is the concept of a Level I, Level II, Level III trauma centers, only as it relates to the military.

His big concern regarding trauma care was that there was one important variable and that was the time from injury to the time of definitive care. At that time they were going through optimal triage in the Army in terms of who saw them, when, where and how they got treated. A lot of his experience came from the combat scene in Italy during World War II. So, he had been newly appointed to the chair of surgery and he was changing the Montreal General from a community or a cottage hospital to an academic center at McGill. He recruited

people from all the medical schools in Canada and there were 18 of us started as junior residents on July 1, 1963. And he was our chairman.

He talked to us all about how he felt that the care of the trauma patient in Quebec was “atrocious” and it needed a system and it needed reorganization. He talked about his military experience and the good care the soldiers received.

That was my first introduction to trauma care and it literally occurred on one of those introductory talks that we’ve all had on the first day of our surgical residency. I was very young and impressionable in those days, and it sort of burned a hole in my brain! It was always at the forefront that we didn’t have a trauma program at Montreal General or in Quebec. The injured patient went to the nearest hospital and then often we got them later on or they never did make it to own hospital.

Much to my absolute dismay, Dr. Robertson got recruited to become principal at McGill University and left the chair of surgery about eight months into my first year. I was devastated, to say the least.

But, fortunately, Fraser N. Gurd took over from Dr. Robertson. His basic science interest was in hemorrhagic shock as it relates to injury or to surgery or anything else. He challenged us all in the research area. At that time there was no career opportunity in trauma, but he encouraged everybody in our program to spend one year in the surgical research lab.

Mine was scheduled to be in the second year of my residency. I started working in the lab looking at hemorrhagic shock. At that time I was clearly wanting to be a cardiothoracic surgeon so I chose to look at the impact of refractory shock on myocardial function. My goal was to see if the role of left atrial bypass would be beneficial. We did all of our experiments on dogs and we produced a lot of necrotizing enteritis in the dog and also hemorrhagic pancreatitis. Therefore, in addition to looking at the impact of it on myocardial function, we got enticed by the bowel injury.

We then began working with a researcher who was in the lab, a student of Fraser Gurd’s (Dr. Gustavo Bounous), on bowel hemorrhage and injury. That really was one of the most productive years and got us interested in the whole picture of shock and critical care.

We returned to the ward after writing a thesis and obtaining a master’s degree in experimental surgery. This year really stimulated my interest in critical care. We had what was then called sort of a roving “shock team” which was the beginning of a surgical intensive care unit. We went to see the sickest patients on all surgical wards. We actually did a cut-down on the radial artery, measured arterial pressure and oxygen saturations and put central lines in. We studied them in a central room which Dr. Gurd organized. It was called the “shock trauma” room.

Although I was doing a general surgical residency, trauma and critical care was always in my background. That experience produced several publications and had a two-fold stimulus in my mind. One was a basic interest in trauma, but the second was the important role of laboratory investigations in elucidating hemorrhagic shock.

I always wanted to have a career in cardiothoracic surgery on the basis of the rest of my experience. I got a residency at the University of Iowa with Dr. J.L. Ehrenhaft, and he was

very interested in thoracic trauma. He'd been heavily influenced by people like Paul Sampson (California), Tom Burford (St. Louis) and Mark Ravage (Baltimore). They served as visiting professors at one time or another. He encouraged me to look at the aspects of trauma care as it affected cardiothoracic surgery. It was a unique experience to be in Iowa. I'm sure you recall the Iowa experience where the university in Iowa City was the state referral center for everybody and they had these incredible vehicles that brought all these patients in on a daily basis. We would sometimes see multiple new carcinomas of the lung and we also saw an incredible number of trauma off the interstate and that led to my introduction in terms of thoracic trauma.

The other coincidental thing was that the University of Iowa then had a massive neuroscience unit with a special interest in myasthenia gravis, multiple sclerosis, amyotrophic lateral sclerosis, all of whom required a tracheostomy for long-term respiratory support. The first important paper I published in the area of thoracic trauma was on complications of tracheostomy. Thus began my interest in airway trauma. I presented this work at a trauma meeting which, coincidentally was held in Montreal. Those are my sort of three mentors and the stimulants towards a career in trauma, shock and hemorrhage.

LUCHETTE

How did your mentors and peers feel about your decision to pursue a career in trauma?

MULDER

I guess in answer to the other question in terms of my choice as reviewed by your peers, they all thought I was crazy and that trauma had no future. Many of the people, whether it was thoracic or general surgery, just felt that trauma was a non-starter and that I was wasting my time. But as it turned out, those were the major stimuli to what proved to be very valuable areas of investigation for me throughout my career, particularly airway trauma. The residency in Iowa was called the residency in Thoracic Surgery in contrast to Canada where it was Cardiovascular Thoracic. I did the full thoracic training at the University of Iowa with Dr. Ehrenhaft and we had an incredible number of airway problems but basically my training was in cardio-thoracic surgery.

LUCHETTE

But you have never lost your passion for trauma care.

MULDER

No. It's always been in the background. I guess it goes back to that very first question about mentors. You know, I often think of the value of a mentor and how they can impress you when you are most easily impressed. That was certainly the case with Dr. Rocke Robertson with his military experience and his writing. He had done diaries in the military every day of his military service during the whole of the Second World War. When you read his diary and what he postulated as what should be done in the civilian sector, it was very, very similar to the concept of a Level I, II and III trauma centers. He said, in spite of the Canadian Medicare

situation, he was totally opposed to the patient going to the nearest hospital. He thought they should go to the hospital where they had the best trained people and the special interests. That was my introduction to trauma system issues in the province of Quebec.

LUCHETTE

Which one of your scientific contributions are you most proud of, and how do you feel it influenced the field of trauma care?

MULDER

Well, I would think that the most important contributions have been in the area of airway, even dating back to my first publication on tracheostomy complications where I made the dramatic statement that there was a 50% complication rate with the procedure. I reviewed all the cases from the neuro unit who had longstanding trachs and respiratory support. When I said there was a 50% complication rate, they all said this could not be true and demanded to review all my data. I had them on data cards. In those days I didn't have a computer, but I put them on file cards with punch holes around the side, put a knitting needle through the various holes and see what fell out. That was interesting as a research technique. But it did confirm the high rate of complications. What we did was discourage any form of emergency tracheostomy. You know, when I was a general surgical resident, it was a bragging right that we could do a tracheostomy in the hallway with a flashlight. But what we didn't document was the high rate of complications.

The point that I made in that first paper was that we needed to do an endotracheal intubation and then a nice quiet, calm tracheostomy in the OR when things were stable. I remember the first discussion at the AAST meeting was related to the high rate of complications in Iowa and that you were admitting weakness if you couldn't do a hallway emergency tracheostomy.

The next paper related to bronchoscopy. We had just gotten our first fiber optic scope from Japan through Olympus. In Iowa, I had been educated by Brian McCabe who is a tiger of an otolaryngologist. There was a big turf battle over who would do rigid bronchoscopy. And Dr. Ehrenhaft was equally tough.

In fact, that leads to another interesting story. It probably relates more to Iowa politics than anything, but on an Iowa football day, which is a Saturday, there were up to 100,000 people in the stands in immediate proximity to the hospital. We got a man off the interstate who had a seatbelt injury with a transection of the trachea in the neck.

I phoned Dr. Ehrenhaft and he said, "Well, I can't get there, can you take care of it?" So I took the patient to the OR and we intubated and placed the tube across the defect. I was repairing the front wall of the trachea, very straightforward, and the chief of otolaryngology, Dr. McCabe, came into the operating room. He grabbed me by the throat and wrestled me out of the OR and asked me who I was. I told him and we had our battle. It was one of those things where your reflex is to grab him around the neck and retaliate. Just at that moment Dr. Ehrenhaft arrived and he rescued me and he continued the debate with McCabe. I went back and fin-

ished the case. That was probably my first significant airway case. And Dr. McCabe was very impressed that we got him intubated and got the defect closed. That led to Dr. McCabe and I becoming best of friends. He liked somebody who he could debate with or argue and stood up to him. And over the years we've remained the very best of friends, right up until his death.

When I got back to Montreal, the first thing we did was introduce fiber optic bronchoscopy and so the instructions came in Japanese and stated, to do a bronchoscopy you had to be intubated. That led to me doing all these bronchoscopies with the scope on an intubated patient, which was marvelous.

Then one day the concept came to me with one of our anesthesiologists that if we put an endotracheal tube over the fiber optic bronchoscope, we could maybe use it to facilitate the difficult airway. We wrote a one-page paper which got more citations than probably any paper I've ever written. It proved to me that sometimes the simple concepts are the best. It is a technique I have used in the disrupted tracheas and disrupted major bronchi to selectively intubate the trachea bronchial tree. Kent Trinkle, who was in Texas, and I often compared notes on how to do this and wrote several papers on the clinical use of the fiber optic scope.

I think the other concept in terms of contributions really relates to our work on shock and trauma and our work as a surgeon in the intensive care unit. This is probably more locally (MGH) than anything else, but we set up the surgical intensive care unit in the hospital and worked extensively with invasive monitoring. We applied it not only to the very sick surgical patient but to the patient with trauma. Just by natural sort of direction we got more and more trauma patients referred to us. But the most important thing that I did was when we reviewed the results of the trauma system in Quebec in the late '80s and we found that our mortality rate was considerably higher than that in the United States and other areas of Canada. Basically it was because patients were going to a smaller center, particularly in the rural areas, and then being referred late. I always remember back to Dr. Robertson's important variable about "time." This particularly stood out when we reviewed the results for neurosurgery. Whereas if they went to a small hospital before they came to a trauma center or to a tertiary care center, the results were at least 25 to 30 percent poorer in terms of neurologic outcome. This resulted in efforts outside the operating room and ventures into politics trying to influence health ministers to emulate what had been done in Orange County. I got people like John West and Don Trunkey to come up and help me. It took me five health ministers and 12-15 years to get through the concept that we needed to reorganize trauma care in the province.

We had a situation where a cabinet minister had a roll over motor vehicle accident and was trapped in his car overnight and died. At autopsy, all he had was a simple airway problem which could have been easily resolved. So the health minister then agreed with us and we introduced a trauma system in Quebec. The most important point that I am proud of here is the fact that as a surgeon working outside the operating room you can often have a major input in changing the health care system. Quebec was early to introduce a province-wide trauma system in Canada.

In the United States, there was a concept that there should be one Level I center per million people. Here in Quebec, we have a little over seven million people so we talked about

seven trauma centers, seven Level I trauma centers. After a lot of debate—and this was all happening in French, and my French wasn't perfect and still isn't—I made a compromise suggestion that we should start with four and the minister said, “Why four?” I said, “Well, there are four universities in Quebec, three French and one English. And each university should have a Level I trauma center to start with.”

Then we set up a series of Level II, Level III and we even had some Level IV which were sometimes in the far north in our native population with the Inuit and the Cree. That has been fully implemented now. Maybe the thing that I'm most proud of is that this has reduced the mortality for injured patients by more than 50 percent and mortality and morbidity rate in spinal cord injuries and neurotrauma by a huge percentage simply by bypassing the first hospital and coming directly to a designated trauma center. Thus, the most important impact that I've made was outside the operating room and outside direct trauma care and in the development of the trauma systems for the province. This didn't happen overnight, let me tell you! I probably started in the mid-70s and we didn't get this in place until 1993. I had great co-operation from my colleagues at the University of Montreal led by Dr. Leon Dontigny.

Just as an aside, my big love outside of medicine has been hockey, specifically National Hockey League hockey. I've been able to work for the Montreal Canadiens now for almost 50 years. There have been several airway injuries which were life-threatening and I developed a protocol for the whole league in terms of airway trauma and system issues so that we have optimal guidelines across the league. If you read them carefully, they are very much related to ATLS principles.

Now they are instituted across the entire league. We have a hockey-specific ATLS program that we put on for the NHL team physicians. I've applied some of my trauma career principles to looking after the seriously-injured hockey player.

LUCHETTE

Is there anything when you look back over your career, David, that you championed, but now, in 2013, you say that probably wasn't the right thing to be advocating for?

MULDER

Yes. I think I probably have two issues, and one of these is something that my wife reminds me about all the time.

I was one of those on the wrong side of the issue about resident work hours and time on call. I was a great advocate of being on call all the time or every second night for your hospital. I got up and pounded the desk, locally, about the need for continuity of care. I guess deep down I probably still am on the wrong side of the issue in that I think we have gone way too far in terms of reduced work hours and have recently had some amazing support from surgical residents who are worried about the concept of the volume of care that they're getting and the way the surgical system works. They're making the same point that I have always made that I think work hours for the dermatology resident and the radiology resident and internal medicine should be different than work hours for a surgeon, particularly in the field of trauma

surgery. I guess I have softened my viewpoint somewhat.

I was always very aggressive about early surgery in thoracic trauma related to penetrating injury and hemothorax. Now with the development of so much better imaging and the concept of minimally-invasive surgery I probably was too aggressive in terms of opening the chest for major chest trauma.

All of these things I think are—like Tennyson said, “I am a part of all that I have seen”—and I was probably influenced by mentors like Rocke Robertson and Dr. J.L. Ehrenhaft who never really went home. We started our day in Iowa at 5:00 a.m. and we had to have a typed report on every patient in his hands by six in the morning. One of the things he taught us outside the operating room was sort of defending your own turf.

In those days we had to do our own arteriograms. We did translumbar aortograms. We did all our own bronchoscopies, as I’ve already alluded to. He taught us about turf battles.

LUCHETTE

What do you think are the two or three greatest advances in trauma care, science and clinical practice?

MULDER

From my point of view, I think certainly the concept of trauma systems and obviously I am biased because of my influence from Rocke Robertson.

The next thing is the concept of critical care. And the third thing is the important role that ATLS has played, particularly in Canada. I think that’s universal but it has revolutionized not only trauma surgeons but as I go down to the emergency room now and I hear everybody using the ATLS language and the changes that it has produced both provincially and locally in our own hospital have been impressive.

I think minimally-invasive surgery has got to be another major advance. It has changed medicine and even to this day and particularly in thoracic surgery for traumatic hemothoraces and conservation of lung parenchyma.

I am very, very impressed now with the impact that trauma systems have had in Canada and Quebec. It’s nothing short of sensational. As we move to more sophisticated prehospital care and regionalization, every year as we benchmark with the U.S. or Germany or anywhere else where the trauma system thing has been a major advance.

We have a young man who is in Toronto training in thoracic surgery and will be coming back to join us. He’s got an MBA and is very interested in the economic side of medicine which I’ve never been smart enough to accomplish but I am hoping that he can now help us with putting a dollar value on the system and the system changes that have been made.

So I think trauma systems with regionalized care has had a major impact. It’s a model that we can use for all health care delivery.

LUCHETTE

As the only Canadian AAST past president that will be interviewed, what are the major

changes in practice patterns that have occurred during your career, in addition to the trauma systems?

MULDER

I think in Canada we're always going to be judged by the concept of universal health care and what that has meant. I have to be very right up-front. It has been enormously helpful in the field of trauma and in the trauma systems organizations.

I feel the single best things about universal health care is that no patient is left out, and no patient with an emergency problem, whether it is a cardiac arrest or a gunshot wound to the chest, is denied immediate access to care. The emergency medicine aspects of universal Medicare are most beneficial.

I have grave concerns now about waiting times and for elective surgery. I think our system is really going to have a hard time being sustained economically related to the trajectory of rising health care costs. We now have two new recruits with an MBA who will help address the effectiveness of our surgical care.

My other concern is the super-specialization that has occurred. Now when we need an orthopedic consult, we have five or six different specialty groups in orthopedics alone. In ophthalmology, a hockey player with an eye injury might have to see four different ophthalmologists to get it dealt with. Super-specialization has clearly been a major change.

I do have grave concerns how we can sustain the current universal health care system. The costs are going through the roof, as they are everywhere. What I am really worried about is the trajectory in terms of the rising costs of health care in Canada.

If you look at a graph, they are very similar to what is happening to the U.S. except they are a little bit lower in Canada. But the trajectory is the same. And this is a great worry to me.

LUCHETTE

What have you found to be the most rewarding or, in other words, what brings you the most joy at the end of the day?

MULDER

Well, I guess the biggest thing that I have always had is working as a team or working as a group. When people talk to me about surgical operations and being the captain of a ship I always remind them that any operation is a "team sport" and requires everybody to be onboard.

The single biggest thing that I have enjoyed, and that's particularly true in trauma, is that it doesn't matter what, if you have a success at the end of the day, it's usually because you have got a strong team working with you. That's been one of the most important things in my mind.

Clearly the other, and I'm sure you would echo this as well, is I've had enormous fun with being a member of the trauma club or the "trauma fraternity" and the camaraderie and the concept of a "band of brothers" that has always been present in the trauma field, whether it is the American Association or the Canadian Association or internationally.

Somehow we, as trauma surgeons, have an enormous *esprit de corps* that has been invaluable to me, whether you are talking about practice or science—it's perhaps the most pleasing thing in my mind.

LUCHETTE

What keeps you up at night and makes you worry about the future?

MULDER

My number one issue is the rising trajectory for the costs of health care in Canada. When we look at what our tax dollars do and when I think that as much as 70% goes into health and education, and how we are going to sustain that and the fact that it is growing faster than our gross national product.

My other concern is the regionalization not only of trauma care but of oncology care. In Canada we haven't figured it out yet in terms of how we can equate patient care to remuneration from the single payer but in terms of relative values, for instance of staying up all night with a ruptured aorta and a ruptured spleen and a closed head injury and then getting your reward or your fee schedule are nowhere related to the contribution that you have made.

Those are my two major worries. The other big thing that I have tried to work on, and it's a trauma system issue, is we still haven't gotten a province-wide helicopter system! We still have a problem with geography, weather and climate in the province of Quebec where sometimes a serious injury occurs 3,000 miles away and it is difficult to get in. That requires fixed wing transport of course.

But sometimes it occurs in our ski hills or areas within 25 miles or kilometers of Montreal and we don't have a helicopter nearby. So road ambulance can be incredible in our winters and weather.

LUCHETTE

What advice do you have for young readers and the surgeons interested in a career in trauma and acute care surgery? And, secondly, what advice would you give them about their life outside the hospital?

MULDER

That's a really important question in recruiting people to our specialty and particularly in Canada. The challenge of surgical education, the role of work hours, gender issues are all vital to today's surgical education. That's one of the greatest challenges in terms of opportunities for trauma.

I'm going to give a talk to the surgical residents in Quebec on Friday about career choices and, in addition to all the good things that you and I understand about trauma and a surgical career, I am going to talk to them about putting family first. If I have done anything wrong, it is probably that I've spent too much time away from home in terms of my career interests and necessities. So I'm going to suggest to the audience that in addition to surgery

being a very attractive career, trauma and especially thoracic trauma, I'm going to talk about the important thing is to have other interests and to have other roles outside of the operating room. I am going to tell them a little bit about my naïve experiences in politics and trying to influence and advocate for health care issues and the fact that they can be very discouraging, but also if you finally get through what you want to accomplish, they can be very rewarding.

LUCHETTE

As young surgeons enter this exciting specialty, what do you perceive are the greatest challenges for the future of acute care surgery?

MULDER

What I've thought about is the future of all surgical care and the role of acute care surgery in our department of surgery. In Canada, ACS [acute care surgery] has gone over very well. In fact, all the surgeons who were on call at night for appendectomy are delighted that the acute care trauma team are doing them. The other thing is the role of minimally invasive surgery in trauma. Those are things that are going to only grow in frequency. Finally, working towards a collaborative approach to all clinical activity.

The other big thing in Quebec and I am sure there are issues in other parts of Canada, is the whole concept of rural trauma care and how we deal with it. We aren't dealing with it as well as we should. If you have an injury 100 or 1,000 miles from Montreal, your care is not going to be as good as if it happened in Montreal. All of us involved in the American College of Surgeons and trauma care have an international responsibility and response. We've got a young man in our department now who is dedicated to bringing the principles of trauma care globally to Africa. We all have to recognize the need for trying to get the same high caliber of trauma care and make it as universal as possible.

LUCHETTE

Where do you think trauma, surgical critical care and acute care surgery will be in 20 years?

MULDER

I think trauma is always going to be there. There is always going to be a career for surgical activity and no more so than in trauma. When I first came to Montreal, Fred, we had very, very few penetrating trauma cases. Now with the concept of regionalization and community violence, our penetrating trauma is 30 to 40 cases per month which is dramatically higher. There is always going to be trauma, whether it is penetrating and interpersonal violence or whether it is motor vehicle trauma or whatever modes of transportation we have in 20 years.

There is always going to be a need for the trauma surgeon. What I tell the students is the specialty of trauma surgery is going to be preeminent in any department of surgery. So it has a great future.

LUCHETTE

As you now look back over your professional career, is there anything you would change about it?

MULDER

Yes. I'm not sure how I would have done it or how I could have done it any differently but I think I probably should have paid more attention to family issues. The important thing is to have a supportive wife and family.

For example, when I was younger and I wanted to be a hockey coach. Time and time again I left my wife to go to the operating room and left her trying to coach a hockey team. The only way we can do this is with collaborative medicine and teamwork. I should have spent more time, more quality time with the family. And that's perhaps one of my biggest regrets.

I don't know if you have read the book, you know the story that Bill Schwab's colleague wrote, *Let's Call It a Draw*. It's a great story about a trauma surgeon who died in Afghanistan. And the family conflicts that he talks about – I don't think I've ever seen expressed so well.

Often I've thought, gosh, I wish I had done better at that. That's maybe one of the things I would try to change. Otherwise, you know, I have to admit I've enjoyed being on the firing line and I never have minded call.

I still take call and enjoy it. And when I was chairman of the whole department of surgery here, I took a regular night on call and trauma call. The lesson I learned was if you're taking call at night you really learn how the system is working and what isn't working. And I would never give that up.

I do think there has to be some sort of re-organization. I overheard one of my sons recently. Someone asked him why he wasn't going into the medical profession. And he said, "Well, I don't think my dad ever slept." And that was their image.

LUCHETTE

Is there anything in your personal life you would have changed?

MULDER

I don't think so. I've enjoyed many other interests. That's what I would strongly encourage. I've had a strong interest in sports, primarily hockey. That's one of the things I've imparted to my children is a love for sports. They all play at a very reasonable level and enjoy it.

Looking after a professional hockey game everybody thinks is work. But I think it's a privilege! It's a great relief from what I do every day. As my mentor said, "It's better than taking antidepressants."

I've started writing down some of my experiences with the Montreal Canadiens. And I hope, as I have more time now, I hope I can produce a document, perhaps a book, about my professional experiences looking after a hockey team.

LUCHETTE

So tell us about your personal and professional plans for the future.

MULDER

As I get older I am clearly going to have to stop operating, probably in the next year or so. I'll soon be 75 and so I think people should stop operating when they're still capable and not be dragged out of the operating room. I'm going to be sure that that doesn't happen. I always think of professional hockey players, Jean Béliveau, to be specific. He says, you know, "You've got to go at the top of your game and not overstay your welcome."

We're going to stay in Montreal. I have a grain farm in Saskatchewan which I inherited from my family. I love to go out and help with the harvest and that sort of goes back to my roots. But I don't intend to live out there. I am going to stay in Montreal.

We enjoy the quality of life in the city and the French/English thing we think is great. The only problem is that none of our children live here so we have to travel to see our nine grandchildren and that's not so bad. One is in England, one in Toronto, one in Boston. So it gives us an opportunity to have some very pleasurable side trips.

LUCHETTE

I want to give you a chance to make a some final comments on the 75th anniversary of the AAST. Is there anything you would like to say that we haven't touched on?

MULDER

I think, Fred, we have covered most of them that I have thought of. I think everybody is looking forward to the 75th anniversary. It is going to be monumental. The AAST has meant the world to me.

And I think our goal is to encourage great young people, particularly females, to consider a career in surgery and specifically trauma surgery.