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Palomar Medical Technologies, Inc.: Planning a Strategy Along the S-Curve

Introduction

In February 2004, Joe Caruso, the CEO of Palomar Medical Technologies, passed through the lobby on the way to his office deep in thought about his plans for the company. Palomar's vision was to revolutionize cosmetics through the use of lasers or light – or, more specifically, the energy contained in light. In doing so, Palomar would be the first company to introduce a mass-market, light-based product for cosmetics.

Caruso's confidence in Palomar's ability to achieve this vision rested on several assets that Palomar had carefully built over the 10 years since its IPO in 1992: the team of scientists and the patents they had accrued, the high quality product set that was resulting from them, and a demonstrated ability to form partnerships to provide the capabilities they did not have internally. Caruso and his team were following a strategy they had designed five years earlier to move them profitably from a small, high-margin niche market to the consumer market, taking steps through intermediate markets that matched the pace at which their technology could get smaller, cheaper and safer.

The path up until this point had not been easy and Caruso was facing the next major challenge: planning the next move in transitioning to the consumer market. What would be the best next markets? What kind and how many partners would they need or should they have? What kind of management issues were going to arise as their portfolio grew more diverse? What should they keep for themselves and what could they share through partnerships? Nothing that had gone on yet prepared them for this kind of complexity.

Professor Rebecca Henderson and Nancy Confrey prepared this case solely as a basis for class discussion. This case is not intended as an endorsement, a source of primary data, or as an illustration of either effective or ineffective management. Copyright Rebecca Henderson and Nancy Confrey, 2004.

Company Background

Palomar was founded by a group of scientists in 1991 led by Mike Smotrich (Chief Technology Officer). Smotrich was a widely recognized laser physicist who had held numerous senior positions in companies prior to Palomar, first in the development of lasers for military applications and then for medical applications, particularly for surgical treatments. Palomar went public in 1992 with a modest \$3 million offering almost a year after Caruso joined the company.

The vision of the early company was to develop laser applications for medicine, such as a non-surgical approach to clearing coronary arteries. The plan for achieving this vision was through acquisition, and in July 1993 Palomar began acquiring what would be 80% of the common stock of Star Medical Technologies, Inc., a company that had developed prototypes of medical and commercial laser products using high power laser diodes but which had not yet been clinically approved. They also purchased Spectrum Medical Technologies, Inc. which manufactured, sold and serviced lasers used for dermatological applications (tattoo removal), and Tissue Technologies Inc., which manufactured, marketed and sold laser systems used for “skin resurfacing” (reducing wrinkles).

From the IPO through 1996, the company focused on establishing a revenue base which led them through a frenzy of acquisitions and investments unrelated to the laser business. They purchased a number of electronics businesses including a manufacturer of high density flexible electronic circuitry, a company designing personal computers with a modular circuit board design, and a company specializing in cable and wire harness assemblies – among many others.

By the end of 1996, Palomar owned over a dozen companies, operating in more than that number of separate locations from California to England, had close to 600 employees and was generating \$70 million in revenue (of which approximately \$18 million was derived from medical businesses and \$52 million from electronics). Palomar’s corporate office acted in the role of a holding company that exercised little influence over or provided little guidance to its subsidiaries. They had not created efficiencies between the companies; each had its own administrative staff, manufacturing, sales and distribution.

Caruso, as Chief Financial Officer at the time, watched as the company became more diverse and less profitable (see Exhibit 1: Summary of financial results from 1994-1996). Paul Weiner, controller at the time and Chief Financial Officer in 2004, remembered how difficult financially this period was for Palomar: “We were always raising money and always running out of cash. We looked into filing for bankruptcy and considered doing so several times. There were times when we didn’t know where we were going to get the funds to meet payroll”. Caruso had joined Palomar because he believed in the potential of the laser business and it concerned him that there seemed to be less and less attention to dedicating the necessary resources to make this business successful. Meanwhile, commercial lasers from other companies seemed to be seeing some success; in April 1995, for example, the publicly traded company ThermoLase had received FDA approval to market services for its laser-based hair removal system.

The Science and Palomar's Scientists

Lasers emit light in wavelengths that have at least three very interesting properties in a living organism. First, the wavelength of light makes it selective to a certain depth in the epidermis – a sort of a filtering effect in which different wavelengths are filtered out at different layers in the skin allowing some wavelengths to extend deeper into the skin than others. Second, the wavelength of light is selective for certain molecules in the skin such as melanin, water, lipids, or blood. When light is absorbed by these molecules, the molecules heat up. Finally, photons that do not encounter these specific molecules or are not absorbed, pass through the skin and dissipate harmlessly. (Exhibit 2 shows the reactivity of different chemicals to different wavelengths of light.)

Lasers can be used to remove hair because of the properties that light can have on melanin, and the central role melanin plays in hair production and growth. Melanin is a molecule found in the shaft of the hair, and in high concentrations at the ball at the base of the hair, called the matrix (or hair growth factory) (see Exhibit 3). When a laser radiates light with an appropriate wavelength, pulse duration and energy level, the energy is absorbed by the hair matrix and changes the growth cycle of the hair. The melanin absorbs the light and heats up and damages the hair matrix to cause the hair to stop growing.

Using similar properties of interaction of light and skin tissue, lasers can also treat other skin blemishes such as age spots, freckles, rosacea, wrinkles, and acne by using different light sources, wavelengths, pulse durations, and power levels.

Developing the science and technology to create products based on the interaction of lasers with skin tissue required a unique combination of laser physicists and dermatologists. Through the leadership of laser physicist Smotrich, Palomar assembled a unique set of laser physicists and dermatologists who specialized in laser/tissue interaction.

Some of the most critical members of Palomar's laser scientist team were from the Russian Laser Institute of St. Petersburg. Due to the reduction of military spending in Russia at the end of the Cold War, Russian laser physicists in the mid-90s found themselves under-funded and -utilized. In 1995, Palomar established a relationship with Dr. Gregory Altshuler, the head of the department of Quantum Electronics and Biomedical Optics at the Petersburg Institute of Fine Mechanics and Optics (“the MIT of Russia”, Altshuler explained). Altshuler was a world-renowned laser physicist who had authored more than 50 patents and 140 papers. In addition to his academic credentials, Altshuler was also an entrepreneur who was instrumental in creating an Austrian start-up that developed the first laser drill for dentistry – a solid state laser like the kind Palomar was developing for laser cosmetics.

Palomar sponsored Altshuler's immigration to the United States where he became Palomar's Vice President of Research. Altshuler retained many of the best scientists on

the staff of the institute, from which the best were periodically chosen to immigrate. This assured Palomar an on-going supply of this relatively rare expertise.

The core of Palomar's assets from the perspective of the impact of lasers on skin tissue and patented science came from its relationship with the dermatologist Dr. R. Rox Anderson at the Wellman Laboratory at Massachusetts General Hospital. Dr. Anderson was an expert in laser tissue interaction, and the inventor of a number of laser procedures. He was responsible for many of the key patents behind light-based hair removal including things like the specification of the time parameters of the pulse of light flashed on the skin (he had determined that it was more effective and safer to use a longer pulse), and an innovative cooling system for the skin.

In 1995, Palomar began a number of studies on the efficacy of a revolutionary light-based product developed by Altshuler and his team to provide long-lasting light based hair removal at a cost low enough to be mass marketed directly to consumers.

In 1999, Palomar and MGH established an amendment to their original Clinical Trial Agreement in which Palomar agreed to fund close to \$500,000 per year of research in return for exclusive license rights to patents arising in the areas of their funded research. The areas of research included "photo thermal removal or reduction of hair, non-invasive electromagnetic targeting of subcutaneous fat and treating sebaceous glands and related skin disorders (e.g., acne) using light except when externally applied chromophores are used" – better understood by the layman as hair removal, fat removal and acne treatment.

Refocusing on the Core Business

In 1997, Caruso approached the Board with a proposal to divest all of its businesses except those related to laser cosmetics. The case he brought was based on Palomar's technology, exclusive patents, strong and unique R&D team, and the vision that the market Palomar should – and could – set its sights on was to build a light-based cosmetic device for home use – a market that no competitor had yet articulated as a possible target.

Despite the strength of the case, the Board was split. Those opposed to the idea felt that the risks entailed were so big as to warrant continued diversity just so there would be a remaining business in case the laser business failed. They also understood that the technology and product development Palomar would have to undertake under this vision would represent a significant business model change for the senior executives – until this point Palomar corporate had been primarily focused on financial transactions rather than operations. Caruso and his team insisted, however: without establishing focus Palomar would never devote the resources and build the capabilities necessary to make the laser cosmetic business successful.

At an impasse, the Board agreed to bring in a third, neutral party to help resolve the dilemma. Dan Valente, a senior vice-president recently retired from EG&G, was already known and respected by members of the Board, including those opposed to this change at the company. Since Valente had bought and sold close to 80 companies in his career, and

had significant experience with a corporate model of growth through acquisition, he was trusted to be un-biased in his assessment of the best future for the company. Together, Caruso, Valente and senior managers throughout the company poured over the potential business opportunities within Palomar, analyzing scenarios of future value to the company. To some on the Board, Valente's conclusion was surprising and disappointing: "Lasers for cosmetics is where this company has true competitive advantage – sell the rest."

Divesting itself of its non-core business took approximately a year. They sold eleven companies – all of the electronics businesses and other non-core or unprofitable businesses such as Tissue Technologies, whose laser for skin resurfacing was declining in sales. They sold many of the companies back to their original management, many of whom hadn't understood why they were purchased by Palomar in the first place. The Board of Directors also changed significantly, replacing all the members who would not support the change in the business. Then it was time to start building.

Defining the Market Opportunity and Strategy

Hair removal for women, in addition to being technically attainable, addressed the needs of a very attractive demographic. There were 28 million women in the United States between 20 and 40 years old. A large percentage of these women regularly invested in various means of hair removal: razors, waxing, electrolysis or lotions. This was a readily exploitable demographic: they had shown that they were willing to try new things (much more so than men, for example), and the channels for introducing them to new things had been well-established. There were 80 million women between 16 and 55; these women are perhaps less likely to try new things or have as much expendable income – but add greatly to the numbers that regularly pay for hair removal. The market size is at least double if adding the potential market across the globe.

Palomar first had to figure out how to provide light-based hair removal to this population with the technology and market channels they currently had, and then plan for how to roll out to new market segments as new versions of the product became available. Caruso described the strategy that Palomar had created:

Our strategy was and remains to this day;

1. Validation of the technology. Validate the medical procedure with doctors first. This will provide the information needed on a large patient population to prove that this high tech solution works better than current low tech solutions and is safe. Devices sold to doctors at this level were very expensive and distributed to a select few (laser dermatologists). This step took 2 years.
2. Expand the market. Advance the technology and reduce cost. This expanded the market and allowed a larger patient population to use the technology. At this level devices were sold to a larger group of doctors (any doctor). This step took 2 years.

3. Broaden consumer awareness. Technology advances again and costs are reduced. This broadens the market again to spas and salons. This broadens consumer awareness. Devices are sold through multiple distribution channels and the service is provided by professionals. We are at this level today. Last year consumers spent more than \$2 billion for laser hair removal procedures.

4. Make the technology the standard and mass distribute to the end user. Technology advances and costs are reduced to a level that these devices can be sold directly to the consumer. Devices would be sold through a large consumer company via a distribution partnership. This is the next stage and should happen over the next few years. This represents a multi billion dollar opportunity.

This technology could someday replace current methods over the next ten years and represent a paradigm shift.

Exhibit 3 shows the market pyramid Caruso and his team used to describe their strategy. Each of these market segments would be introduced to a product that matched that segment's price tolerance and proficiency with lasers. As the number of successful treatments grew and the number of years the treatments had been performed without any long-term negative effects, the easier it would be to expand to a broader set of buyers. As important as validating the technology with each market segment was the increased customer awareness and market penetration that would occur.

Palomar's strategy relied on their ability to steadily improve the technology, making it steadily smaller, less expensive, more reliable and safer. With dependable increases in the efficiency of conversion of electricity to light and the efficiency of light delivery to the target, Palomar planned a set of products that decreased in size, cost and complexity to use and increased in safety. Exhibit 4 shows how Altshuler envisioned the changes his team would have to accomplish in order to move to new market segments.

The consumer device would consist of a small, inexpensive light source and consumable component (like the razor and blade). Periodic use of the device could virtually eliminate the need for shaving.

When Palomar's product set was mature, it would serve three markets simultaneously: 1) the permanent hair removal treatments administered by doctors using a product costing approximately \$50,000; 2) a salon/spa version selling for \$20,000 that did not result in permanent hair loss but would be part of a salon's pampering regime; and 3) a consumer product selling for a low price with recurring revenue from the consumable component.

Since hair removal products were considered a medical device, FDA clearance had to be built into the product plan prior to sale of each product. All devices Palomar had developed to date had succeeded in getting FDA clearance through the 510K process, which typically took 7-12 months. Products could be sold outside of the U.S. prior to FDA clearance.

Executing on the Plan

After Palomar made the decision to refocus on its core laser business in 1997 and subsequently divested its non-core and unprofitable businesses, they were left with few sources of immediate revenue. Exhibit 5 shows Palomar's products for hair removal with their date of introduction, price and cost.

Palomar's first laser hair removal product was a "ruby laser", called EpiLaser™. It had originally been developed by their Spectrum division for tattoo and pigmented lesion removal. The EpiLaser™ weighed 800 pounds, was about the size of a refrigerator, and was for sale to dermatologists for \$150,000. Despite the device's size and cost, dermatologists found this service to be an easy add-on to current treatment, and the fact that it was a self-pay service rather than reimbursed through managed care meant that the device could pay for itself in a relatively short period. The product was covered by a patent licensed from MGH, and included a cooled tip and a long pulse width that permitted safe and effective removal of multiple hairs simultaneously. This allowed for more comfortable treatments of larger areas than previous products, and Palomar believed this capability would be the winning differentiator between themselves and other laser hair removal products and electrolysis, both of which could only treat small areas at a time. In March 1997, the EpiLaser™ obtained clearance for sale in the U.S., and on July 1998 obtained clearance as the first "permanent hair reduction" laser – a first in the industry.

Palomar also received FDA clearance in 1997 for their LightSheer™ product that was originally developed in their Star Medical Technologies subsidiary. The LightSheer™ was the 120 pound, \$100,000 product intended for use by a broader group of doctors than just dermatologists. Caruso and Valente knew that Palomar didn't have the market or sales capabilities that would make LightSheer™ successful with this larger market, so they spent nearly a year pushing a deal with Coherent. Coherent was a \$400 million, 30-year-old laser company with broad-based technology in medicine, science and industry but without hair-removal laser capabilities. By November 1997, they succeeded in establishing a three year agreement in which Coherent committed to sell LightSheer™ lasers manufactured by Palomar, and Coherent would receive exclusive distribution and licensing rights of the LightSheer™ product and technology, with a commission for any LightSheer™ product they sold.

This was a critical point for Palomar. They had developed leading edge, patented technology and a world class sales and distribution capability through Coherent – at the same time that the Company was financially at its weakest. With an unproven product and a history of operating losses, they could not secure traditional working capital or equity funding to launch the LightSheer™ and ramp up manufacturing to support the sales expected from Coherent. Fortunately, the Board stepped in. Valente led a \$7 million private fundraising effort to keep the company afloat, convincing friends and long-time business associates that the beauty business was a good bet and Palomar was well positioned to exploit it. Another director, A. Neil Pappalardo, guaranteed a \$10

million working capital line with a bank for additional funding. Without this infusion of capital, Palomar could have easily failed to meet its commitments to Coherent which, by agreement, would have handed the technology over to Coherent.

At the end of the first year of their agreement, Coherent was selling Palomar's products at a surprising \$80 million/year run rate – much higher volume than anticipated. Coherent offered to buy the LightSheer™. Since Palomar had their product roadmap in the back of their minds and badly needed cash to fund the research to implement that roadmap, they made a very bold step: they sold the technology (in the form of the entire Star subsidiary) to Coherent for \$65 million in cash, the assumption of a \$5M debt and an on-going 7.5% royalty on all sales of the technology.

The deal with Coherent allowed Palomar to pay off its existing debts, and gave them the R&D funding they needed to develop the next product – a smaller, cheaper, safer lamp-based product for the spa and salon market. It also, however, put them under extreme pressure for new sources of revenue; before the sale, the LightSheer™ had accounted for 80% of Palomar's sales, and the sale agreement with Coherent prohibited Palomar from selling a "LightSheer-like" product for a period of two years. Shareholders seemed concerned about the decision to sell the lucrative new product prior to having a replacement for it ready to go; between August 28th and October 9th 1998, Palomar's stock stayed under a dollar, threatening a delisting from the Nasdaq.

New products designed around the LightSheer™ technology were introduced, but revenues from them took some time to generate. In the first quarter of 1999, Palomar received FDA clearance and introduced the E2000™ Ruby Laser System, which was the second generation of the EpiLaser™ weighing only 400 pounds and priced at \$130,000. The E2000™ was intended for sale to dermatologists like the EpiLaser™, but could treat large areas of the body much more rapidly than the EpiLaser™.

Also introduced in 1999, the SLP1000™ ("Super Long Pulse") was the first high-powered diode laser designed to provide a pulse width of up to 1000 milliseconds (about 10 times the length of pulses provided by other lasers). About the size of a personal computer, it was half the size of previous lasers, and was the first laser capable of hair removal on all skin types (previous lasers had difficulty with hair removal on dark skinned or tanned women). Palomar also introduced a set of removable hand pieces for the SLP1000™, for both hair removal and treatment of veins. The SLP1000™ was priced at \$65,000 and was targeted at Palomar's second level on the pyramid: an expanded set of doctors in addition to dermatologists and plastic surgeons.

Palomar introduced the EsteLux™ in March 2001 – the \$40,000 model intended for the spa and salon market. The EsteLux™ was Palomar's first lamp-based (versus laser) product, and was the first system of its kind that was inexpensive and simple enough to use that it could be considered for sale to practitioners in spas and salons rather than just physicians. All FDA clearances allow sales to physicians and others who are licensed by the state (referred to as "licensed practitioners"), but Palomar needed the much more difficult to attain clearance for non-physician use – the same clearance required by drug

companies to move a drug from prescription use to over the counter. This clearance had to be tackled state by state, and was a major hurdle towards realizing Palomar's strategy.

Like the SLP1000™, the EsteLux™ could be tailored for different uses through different hand pieces, each selling for approximately \$10,000. The EsteLux™ would eventually become a very popular product, but significant revenue did not start until almost a year later.

By 2004, Palomar not only had a set of products that embodied their 1997 vision – a set of products suitable to different market segments – but also a modular product platform that created manufacturing efficiencies and reduced total cost of ownership for the buyer. Each product – the EsteLux™ for the mid-market (spa and salon), MediLux™ (high end for physicians) and NeoLux™ (entry level product) shared 70-80% of components in the base unit. The products came with hand pieces to customize the base unit for different uses (such as hair removal, age spots, facial and other vascular lesions and acne); the hand pieces for each base unit were basically identical except for the piece connecting the hand piece to the base unit. Not only did Palomar's hand pieces have a longer expected life than competitors' (2 years or 100,000 shots), but they could be replaced at a cost much lower than the cost of the service calls required to fix their competitors' products. The manufacturing efficiencies derived from this common architecture across products started to be evident as volumes increased (see Exhibit 7 for 2003 financial results); the revenue stream from replacement hand pieces were not expected to start until 2005.

In February of 2004, Palomar introduced the StarLux™ – a new high end product that provided water cooling in the hand pieces not previously available on earlier Lux platforms. The StarLux™ supported the earlier lamp-based hand pieces, but the improved cooling capability also enabled the StarLux™ to increase power to a level sufficient to support a laser hand piece for improved treatment of leg veins. Like the earlier lamp-based hand pieces, the laser hand piece included the light source directly in the hand piece so as not to interfere with the platform manufacturing efficiencies. This product dramatically increased the flexibility and efficacy of the physician-focused product.

Palomar claimed that their products and technology had been used in more than 10 million treatments worldwide, used by dermatologists, other doctors and in spas and salons. Their 2003 financial results started to reflect the success they were witnessing; product revenues for 2003 had increased 39% from 2002, and gross profit from product sales increased 61%. Their cash position improved significantly, and long-term debt was eliminated.

A summary of financial results from 1998-2002 is provided in Exhibit 6; financial results for 2003 are provided in Exhibit 7.

The Competition

Despite the strength of its patent claims, Palomar faced many competitors, many of them large and well-established. Many of these companies had better sales and marketing capabilities and better cash positions. Most had started as medical device companies and had direct sales forces with personal relationships with the doctors to whom they sold. Candela, for example, was a “pioneer in the development and commercialization of advanced aesthetic laser systems that allow physicians and personal care practitioners to treat a wide variety of cosmetic and medical conditions”. Candela was founded in 1970, went public in 1986, and began to focus on lasers for cosmetic applications in the mid-90s. It had 2003 revenues of \$80 million and market cap of almost \$200 million. In Candela’s list of top non-surgical procedures, hair removal was second (tied with collagen, and right after botox). Candela already had FDA clearance to move products into the market for acne, wrinkles, psoriasis, and rosacea.

The industry was characterized by on-going acquisitions and partnerships. The medical division of Coherent, for example – the company to whom Palomar sold its LightSheer™ technology – was sold to the laser company ESC Medical to form a company called Lumenis. Lumenis called itself the “worldwide leader in light based and laser systems” with more than 60,000 devices installed globally (compared to Candela’s 7,000). Lumenis was struggling financially in 2003, however, with continuing losses and threats of delisting from the NASDAQ. According to a member of the Palomar sales force, “Lumenis made the mistake of being greedy. They priced their products very high so they could use the margin to build their infrastructure. Now their products are flooding the second-hand market. Our products are priced very competitively compared to theirs.”

Against competitors like these, Palomar had to rely on their technical strength, their ability to innovate, and, above all, their vision and ability to drive towards the consumer market. In the drive towards the consumer market, Palomar had to concentrate on decreasing price and size while increasing safety and efficacy. “We’re the force in the market that’s driving down prices, which is hard for companies that have extensive sales forces.”

Palomar knew that its patents were being infringed by much of the competition, and sent out letters offering to license competitors for the same 7.5% royalty being paid by Coherent / Lumenis. In response, three new companies signed up to the license and royalty. They knew that getting further licensees would require litigation, an expensive proposition for a small, cash-poor company. Palomar’s General Counsel, Patricia Davis, estimated that a patent infringement lawsuit usually took 2 years and \$2 million. If they won a suit, however, it might act as a catalyst for other firms to voluntarily decide to pay royalties, and it could also provide Palomar with the cash to fund additional litigation.

When Palomar became aware that the company Cutera’s products blatantly incorporated their technology and that it was being led by a former employee of Coherent – Palomar decided to take action. Despite the risk, this law suit demonstrated Palomar’s belief in its patent claims – a confidence that had to have helped in striking their first partnership for

moving to the consumer market. An initial ruling on the case in February 2004 in which the scope and terms of the patent were defined came out strongly in Palomar's favor. This ruling set the stage for the trial, in which, if Palomar prevailed, Cutera could be made to pay millions in damages for past sales and could also be ordered to stop selling any products for light-based hair removal.

The First Step toward the Consumer Market: the Gillette Deal

On February 14, 2003, Palomar announced that it had signed a deal with Gillette to complete development and commercialize a home-use, light-based hair removal device for women. Under the agreement, Gillette would provide for up to \$7 million in support of development over a period of 30 months. In exchange, Gillette was given exclusive rights for commercialization, manufacture and distribution of the product(s) developed. Palomar would receive 6% in fees from Gillette's world-wide sales of products incorporating Palomar technology – 2% royalty on products sold in countries in which Palomar's patents held, and 4% for technology transfer for as long as Gillette sold a light-based hair removal products, essentially to compensate for the previous development work Palomar had done and their expertise in the area.

Getting to this agreement had been an arduous, two year process for the Palomar team. Several large, personal product companies were interested; consumer light-based cosmetics was an obvious area of growth for these companies, and none of them had the scientific capabilities to do it themselves. Each company's attorneys needed to do extensive due diligence to show that Palomar was not infringing others' patents, and that any investment made could be protected by Palomar's patents. Some companies pushed for exclusive negotiation periods, others to delay the decision until the technology was further along, and others pushed to do the deal very quickly. The team working on the negotiation struggled to manage the day to day business while responding to all of the whims of its suitors. In the end, it was Caruso that set a date by which the best offer had to be in, resulting in the deal with Gillette.

Next Steps

Coming up on a year since the announcement of the Gillette agreement, Caruso was struggling with a new set of challenges. Most important were deciding which markets to move to and when, which and how many partners to establish, and how to brand their products.

First, the set of applications to which their technology could be applied only seemed to grow and yet their resources were not limitless: how could they think about which markets to develop and when? In addition to the other skin care ailments they could address, they also saw big opportunities in dentistry, ophthalmology, and surgery. There was also a very promising opportunity Palomar was pursuing with the U.S. military; in 2004, Palomar received an initial \$2.5 million contract from the U.S. Department of the Army to develop a light-based self-treatment device for "Pseudofolliculitis Barbae" or PFB, commonly known as "razor bumps". PFB had been called "the most significant

dermatological disease in the US Army", affecting combat readiness, unit cohesion, and individual morale of over 50% of African American and Hispanic military personnel – representing an enormous opportunity for Palomar. How was Palomar to manage the trade-off between exploiting – and being first to market with – all these opportunities while not over-stretching R&D resources? What prioritization criteria could they apply? How might they decide which of their opportunities could move to the consumer market and which should stay with physicians?

At the center of this discussion was the issue of how Palomar should design their partner strategy as markets and products became more complex. There were many views on this within the management team. Some felt that staying with a single partner would be the easiest approach in terms of management of the relationship. With Gillette, the deal centered on ownership of a “field of use” – hair removal for women – rather than on technologies because they knew there would be significant overlap in the technologies used across different fields of use. From their early partnerships, they knew it was critical that partners were happy; if there were multiple partners, many problems were sure to arise regarding contributions by different parties to technology – particularly if the partners that Palomar chose happened to be competitors.

On the opposite end of the spectrum were those who felt that Palomar should develop as many partners as possible. Each ailment or problem addressed should be distributed by the partner best known in that field – there were very few consumer product companies that were known for multiple areas, and none that were known for all of the areas that Palomar planned to address. In addition, a single partner would develop too much leverage. What would happen, for example, if a partner decided that owning Palomar would be in their best interest? With multiple partners, it would be less likely that an unwanted take-over could be accomplished – the other, happy partners would protect their asset.

Was there a middle ground in which partners could take on groups of product areas? Did they establish these groups and then find the best partner for each – or did they establish partnerships first and figure out how broad the scope of that partners’ distribution should be?

Finally, and highly related to both partnerships and market opportunities: how should Palomar address branding their product set? A single brand for all Palomar technologies? Brands that reflected specific problem solutions? Brands related to problems that could be grouped?

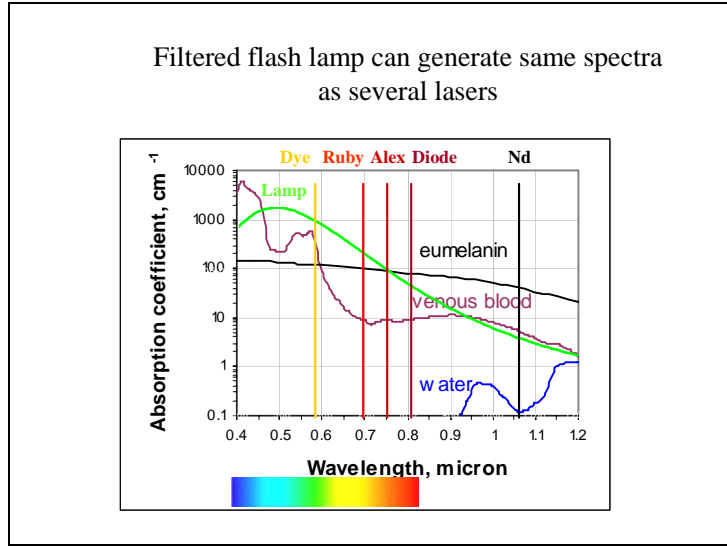
Caruso, in summing up his concerns, explained: “The management task here is enormous. We need to decide what is important to keep, and what can be shared with partners. When do we bring in partners? How do we manage these partners successfully?”

Exhibit 1: Summary of financial results 1994-1997

Income Statement Data	Year ended March 31,	Nine months ended December 31,	Year ended December 31,		
	1994	1994	1995	1996	1997
Revenues	\$10	\$40	\$5,610	\$17,607	\$20,995
Cost of Revenues	--	18	3,464	14,169	20,056
Gross profit	10	22	2,146	3,438	939
Operating Expenses					
Research and development	1,911	2,939	3,965	6,297	11,990
Sales and marketing	--	--	2,769	5,077	6,960
General and administrative	1,630	1,561	2,142	9,753	15,332
Business development	--	1,240	1,409	2,880	2,061
Restructuring and Asset Write-off	--	--	--	1,661	3,325
Settlement and Litigation Costs	--	--	700	880	3,199
Total operating expenses	3,541	5,740	10,985	26,548	42,867
Loss from operations	(3,531)	(5,718)	(8,839)	(23,110)	(41,928)
Interest Expense	(33)	(76)	(766)	(271)	(6,994)
Interest Income	53	38	912	1,355	456
Net Gain on Trading Securities	--	--	201	2,033	(52)
Asset Write-off	--	--	--	(1,397)	(9,658)
Other Income (Expense)	82	67	102	592	(193)
Net Loss from Continuing Operations	(3,429)	(5,689)	(8,390)	(20,798)	(58,369)
Loss from Discontinued Operations:					
Loss from Operations	(634)	(3)	(4,231)	(20,896)	(29,509)
Gain on Dispositions, net	--	--	--	3,830	2,074
Net Loss from Discontinued Operations	(634)	(3)	(4,231)	(17,066)	(27,435)
Net Loss	\$(4,063)	\$(5,692)	\$(12,621)	\$(37,864)	\$(85,804)
Basic and Diluted Net Loss Per Common Share:					
Continuing Operations	\$(0.85)	\$(0.84)	\$(0.60)	\$(0.84)	\$(1.79)
Discontinued Operations	(0.15)	0.00	(0.30)	(0.65)	(0.78)
Total Loss Per Common Share	\$(1.00)	\$(0.84)	\$(0.90)	\$(1.49)	\$(2.57)
Weighted Average Number of Common Shares Outstanding					
	4,053	6,759	14,165	26,167	35,105
Balance Sheet Data:					
Working Capital	279	2,491	12,998	15,203	(9,139)
Total Assets	2,581	6,551	33,656	67,533	28,968
Long-term obligations	37	2,322	1,765	14,665	12,446
Stockholders' Equity (Deficit)	1,466	2,794	25,289	38,077	(6,184)

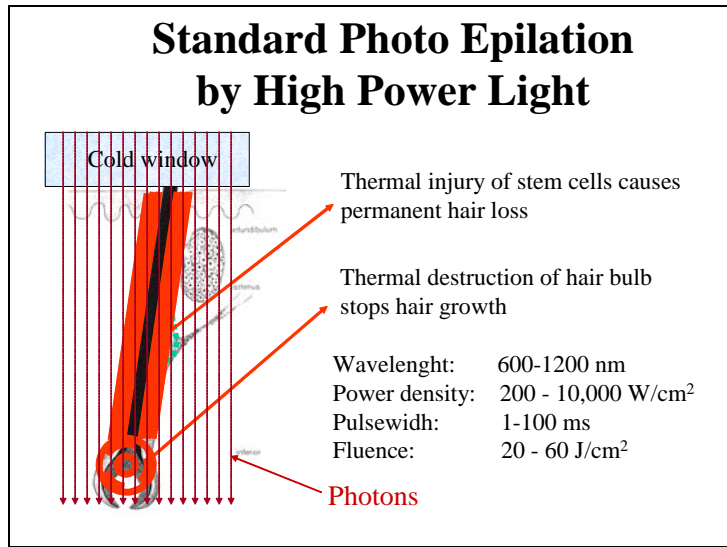
Source: Form 10-K Palomar Medical Technologies

Exhibit 2: Reactivity of different chemicals to different wavelengths of light



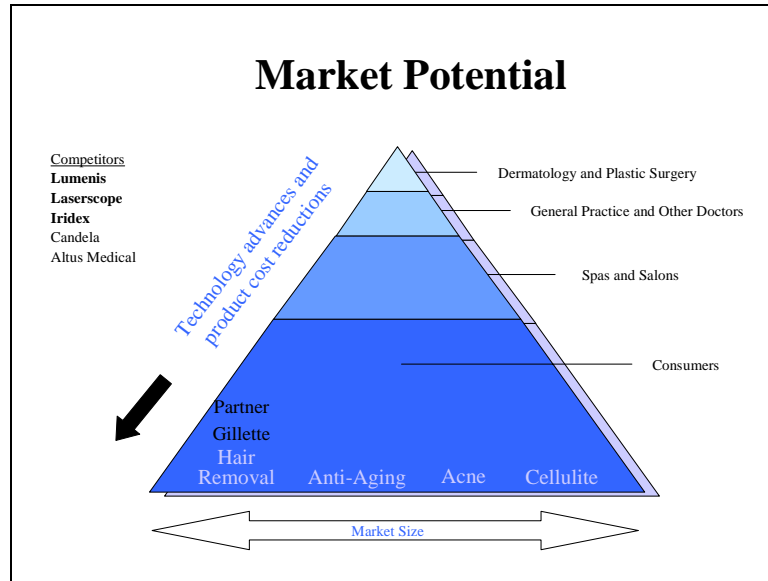
Source: Palomar company slide presentation

Exhibit 3: Diagram of a hair shaft



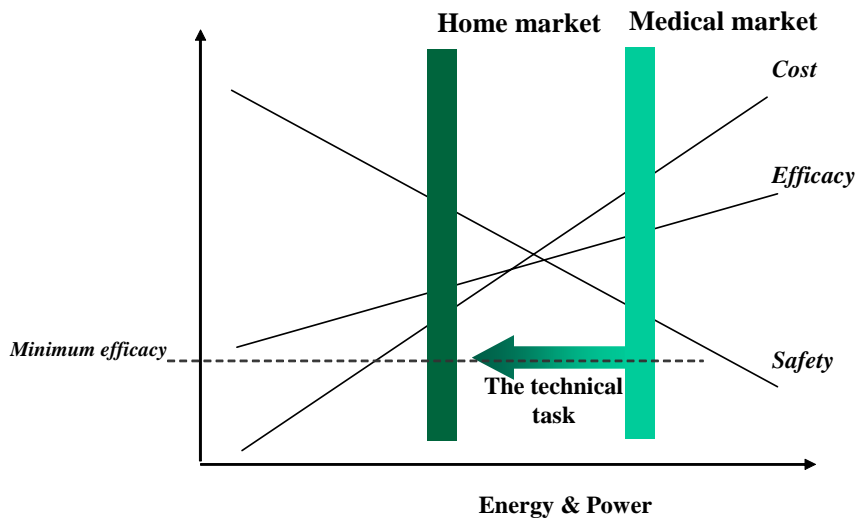
Source: Palomar slide presentation

Exhibit 4: Palomar's market pyramid



Source: Palomar slide presentation


Exhibit 5: Altshuler's framing of the challenge



Source: Company interviews


Exhibit 6: Palomar's products for hair removal

Evolution of Palomar Products




E2000
Ruby Laser

400 pounds



LightSheer

120 Pounds



MediLux

48 pounds

Product	Price	Material		Year
		Price	Cost	
EpiLaser™	\$150K	\$80K		1996
E2000™	\$130K	\$60K		1997
LightSheer™	\$100K	\$40K		1998
SLP1000™	\$65K	\$25K		2000
EsteLux™	\$40K	\$ 4K		2001
MediLux™	\$50K	\$ 4K		2003
NeoLux™	\$30K	\$ 4K		2003
StarLux™	\$80K	\$ 5K		2004
Lux Handpieces	\$10K	\$ 1K		2002-4
Home Devices	?	?		?

Source: Palomar slide presentation

Exhibit 7: Financial results 1998-2002

Selected Financial Data

(In thousands, except per share data)

	Years Ended December 31,				
	1998	1999	2000	2001	2002
Consolidated Statements of Operations Data:					
Revenues	\$ 44,514	\$ 24,251	\$ 13,176	\$ 16,654	\$ 25,418
Operating expenses (income)	21,463	8,741	2,647	5,302	13,070
Income (loss) from operations	30,897	(24,297)	13,176	12,042	13,212
Income (loss) from continuing operations	(9,434)	33,038	(10,529)	(6,739)	(142)
Income (loss) from continuing operations	(9,967)	25,501	(8,875)	(5,471)	39
Cumulative effect of change in accounting method	—	—	(712)	—	—
Net loss from discontinued operations	(2,624)	(435)	—	—	—
Net income (loss)	(12,591)	25,066	(9,587)	(5,471)	39
Basic net income (loss) per common share:					
Continuing operations	\$ (1.26)	\$ 2.48	\$ (0.90)	\$ (0.54)	\$ 0.00
Cumulative effect of change in accounting method	—	—	(0.07)	—	—
Discontinued operations	(0.29)	(0.04)	—	—	—
Total basic net income (loss) per common share	\$ (1.55)	\$ 2.44	\$ (0.97)	\$ (0.54)	\$ 0.00
Basic weighted average number of common shares outstanding	8,981	10,153	10,247	10,805	11,372
Diluted net income (loss) per common share:					
Continuing operations	\$ (1.26)	\$ 2.39	\$ (0.90)	\$ (0.54)	\$ 0.00
Cumulative effect of change in accounting method	—	—	(0.07)	—	—
Discontinued operations	(0.29)	(0.04)	—	—	—
Total diluted net income (loss) per common share	\$ (1.55)	\$ 2.35	\$ (0.97)	\$ (0.54)	\$ 0.00
Diluted weighted average number of common shares outstanding	8,981	10,776	10,247	10,805	11,582
Consolidated Balance Sheet Data:					
Working capital	\$ (6,004)	\$ 18,347	\$ 8,864	\$ 2,944	\$ 3,934
Total assets	23,526	34,843	21,000	13,171	13,398
Long-term debt	3,150	1,622	500	—	—
Stockholders' equity (deficit)	(5,399)	18,510	9,365	3,896	4,718

Source: Form 10-K Palomar Medical Technologies

Exhibit 7: 2003 Financial results

	Years Ended December 31,				
	2003	2002	2001	2000	1999
(In thousands, except per share data)					
Consolidated Statements of Operations Data:					
Revenues:					
Product revenues	\$ 31,332	\$ 22,549	\$ 11,158	\$ 8,781	\$ 21,279
Royalty revenues	841	2,869	5,496	4,395	2,972
Funded product development revenues	2,600	—	—	—	—
Total revenues	34,773	25,418	16,654	13,176	24,251
Costs and expenses (income):					
Cost of product revenues	13,031	11,200	9,153	8,771	14,322
Cost of royalty revenues	336	1,148	2,199	1,758	1,189
Research and development	6,058	4,360	6,045	7,851	8,022
Selling and marketing	8,483	5,785	3,504	3,153	6,587
General and administrative	4,256	3,067	2,492	3,866	5,060
Goodwill and asset write-off	—	—	—	746	—
Costs incurred for proxy contest	—	—	—	—	624
Settlement and litigation costs	—	—	—	—	2,500
Gain from sale of subsidiary (1)	—	—	—	(2,440)	(47,091)
Total cost and expenses (income)	32,164	25,560	23,393	23,705	(8,787)
Income (loss) from operations	2,609	(142)	(6,739)	(10,529)	33,038
Other income (expense):					
Interest income	74	74	759	1,203	1,316
Interest expense	(28)	(120)	(98)	(155)	(597)
Other income	58	227	185	380	411
Swiss franc redemption	—	—	—	—	(6,167)
Income (loss) before benefit (provision) from income taxes	2,713	39	(5,893)	(9,101)	28,001
Benefit (provision) from income taxes	656	—	422	226	(2,500)
Cumulative effect of change in accounting Method	—	—	—	(712)	—
Net loss from discontinued operations	—	—	—	—	(435)

Net income (loss)	\$ 3,369	\$ 39	\$ (5,471)	\$ (9,587)	\$ 25,066
Basic net income (loss) per common share:					
Continuing operations	\$ 0.25	\$ 0.00	\$ (0.54)	\$ (0.90)	\$ 2.48
Cumulative effect of change in accounting method	—	—	—	(0.07)	—
Discontinued operations	—	—	—	—	(0.04)
Total basic net income (loss) per common share	\$ 0.25	\$ 0.00	\$ (0.54)	\$ (0.97)	\$ 2.44
Diluted net income (loss) per common share:					
Continuing operations	\$ 0.21	\$ 0.00	\$ (0.54)	\$ (0.90)	\$ 2.39
Cumulative effect of change in accounting method	—	—	—	(0.07)	—
Discontinued operations	—	—	—	—	(0.04)
Total diluted net income (loss) per common Share	\$ 0.21	\$ 0.00	\$ (0.54)	\$ (0.97)	\$ 2.35
Weighted average number of common shares outstanding:					
Basic	13,399	11,372	10,805	10,247	10,153
Diluted	15,917	11,372	10,805	10,247	10,776

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	Years Ended December 31,				
	2003	2002	2001	2000	1999
Consolidated Balance Sheet Data:					
Working capital	\$ 13,670	\$ 3,934	\$ 2,944	\$ 8,864	\$ 18,347
Total assets	21,660	13,398	13,171	21,000	34,843
Long-term debt	—	—	—	500	1,622
Total stockholders' equity	14,364	4,718	3,896	9,365	17,092

Source: Form 10-K Palomar Medical Technologie

