FORM 8-K

**CURRENT REPORT PURSUANT
TO SECTION 13 OR 15(D) OF THE
SECURITIES EXCHANGE ACT OF 1934**

Date of report (Date of earliest event reported): July 21, 2016

SECOND SIGHT MEDICAL PRODUCTS, INC.
(Exact Name of Registrant as Specified in Its Charter)

California
(State or Other Jurisdiction of Incorporation)

333-198073	**02-0692322**
(Commission File Number)	(IRS Employer Identification No.)

**12744 San Fernando Road, Suite 400
Sylmar, California 91342**
(Address of Principal Executive Offices)

(818) 833-5000
(Registrant's Telephone Number, Including Area Code)

(Former Name or Former Address, if Changed Since Last Report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Item 8.01 Other Events

On July 21, 2016, The American Academy of Ophthalmology published a paper entitled "Five year safety and performance results from the Argus II Retinal Prosthesis System Clinical Trial". The trial follows the assessment of 30 subjects implanted with the Argus® II retinal prosthesis in 10 centers throughout the United States and Europe. All patients were blind (i.e., with bare light perception or worse) from retinitis pigmentosa or similar disorders. Throughout five years of clinical study, results showed that patients' visual function improved after implantation with the Argus II and these improvements were sustained over five years. Patients reported that using Argus II had a positive impact on their wellbeing, including a renewed connection with loved ones and the world around them. Results also demonstrated that the Argus II had an acceptable safety profile.

A copy of the press release entitled "Second Sight Announces Five-Year Data from Argus II Retinal Prosthesis System" is attached to this report as Exhibit 99.1 and the paper "Five year safety and performance results from the Argus II Retinal Prosthesis System Clinical Trial" is attached to this report as Exhibit 99.2. Both are incorporated herein by reference. The above description of the paper is qualified in its entirety by reference to the exhibits.

Exhibit No.	**Description**
99.1	Press Release issued July 21, 2016
99.2	Five year safety and performance results from the Argus II Retinal Prosthesis System Clinical Trial

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Date: July 25, 2016

SECOND SIGHT MEDICAL PRODUCTS, INC.

/s/ Thomas B. Miller
By: Thomas B. Miller
Chief Financial Officer

Exhibit 99.1

Second Sight Announces Positive Five-Year Data from Argus II Retinal Prosthesis System

Study Results Published in *Ophthalmology* Show Safety and Sustained Improvement in Visual Performance for Blind Patients

SYLMAR, Calif.—(BUSINESS WIRE)— Second Sight Medical Products, Inc. (NASDAQ:EYES) ("Second Sight"), the developer, manufacturer and marketer of implantable visual prosthetics that provide some useful vision to blind patients, today announced positive five-year outcomes associated with patients using the Argus® II Retinal Prosthesis System ("Argus II"). The Argus II captures images on an eyeglass-mounted miniature video camera, converts the images to electrical pulses, and then transmits those pulses wirelessly to electrodes implanted on the retinal surface, bypassing defunct retinal cells and stimulating the viable retinal cells in patients with severe to profound retinitis pigmentosa (RP).

The paper entitled "Five year safety and performance results from the Argus II Retinal Prosthesis System Clinical Trial" follows the assessment of 30 subjects in the clinical trial (NCT00407602) implanted with the Argus II in 10 centers throughout the United States and Europe.[1] All patients were blind (i.e., with bare light perception or worse) from RP or similar disorders. Throughout five years of clinical study, results showed that patients' visual function improved after implantation with the Argus II and these improvements were sustained over five years. Patients reported that using Argus II had a positive impact on their wellbeing, including a renewed connection with loved ones and the world around them. Results also demonstrated that the Argus II had an acceptable safety profile.

"For patients with RP who are living in darkness, the long-term benefits of the Argus II in restoring some useful vision represents a very meaningful milestone," said Lyndon da Cruz, MD, PhD, Consultant Retinal Surgeon at Moorfields Eye Hospital NHS Foundation Trust and lead author for the study. "Perhaps most exciting is the proven ability of the Argus II to increase patients' functional vision. With the Argus II, patients can perform tasks that would not be possible without the device. This can be a life-altering change. It is good that we have now shown that these changes last for many years after implantation."

"We are excited to see that the substantial visual improvement gained from the Argus II endures over five years - promising news for patients blinded by RP, as well as for our company's continued efforts to restore vision," said Will McGuire, President and CEO of Second Sight. "The study supports the long-term safety profile and benefit of the Argus II system, and these results will continue to drive our approach in the future, both in the development process and in seeking additional regulatory and reimbursement approvals for the Argus II."

In the Argus II study, three types of visual function tests were performed using computer-run assessments: square localization (i.e. object detection), direction of motion (i.e. motion detection) and discrimination of oriented gratings (i.e. visual acuity). Two types of real-world orientation and mobility (O&M) tests were also performed: one test asked patients to locate and touch a door, and the second test asked patients to follow a white line on the floor. The ability to find a door and follow a line have real-world meaning with respect to mobility, ambulation and safety.

Earlier results from this trial were used to gain FDA approval of the Argus II in addition to CE Mark in Europe. The Argus II is the first and only retinal implant to have both approvals, and is the only system to have demonstrated long-term reliability and benefit. Today, over 200 patients have been treated with the Argus II.

Positive results of this long-term clinical study follow news about the Argus II's long-term cost effectiveness published in 2014. Researchers evaluated the costs of using the Argus II over 25 years beginning at age 46 (the estimated average age that patients with RP are diagnosed as legally blind) and found that the incremental cost per ratios for the Argus II were about 16,000 US Dollars/quality-adjusted life year - well below payers' cost utility thresholds and costs of "care as usual."[2,3]

Current research efforts by Second Sight include a feasibility study of the Argus II for individuals with dry age-related macular degeneration; hardware and software upgrades for existing and future Argus II patients; and the development of an advanced visual prosthesis, the Orion™ I Visual Cortical Prosthesis, aimed at patients with nearly all other forms of blindness.

About the Argus® II Retinal Prosthesis System

Second Sight's Argus II System provides electrical stimulation that bypasses the defunct retinal cells and stimulates remaining viable cells inducing visual perception in individuals with severe to profound retinitis pigmentosa (RP). The Argus II works by converting images captured by a miniature video camera mounted on the patient's glasses into a series of small electrical pulses, which are transmitted wirelessly to an array of electrodes implanted on the surface of the retina. These pulses are intended to stimulate the retina's remaining cells, resulting in the perception of patterns of light in the brain. The patient then learns to interpret these visual patterns, thereby regaining some useful vision. The system is controlled by software and is upgradeable, which may provide improved performance as new algorithms are developed and tested. The Argus II is the first artificial retina to receive widespread approval, and is offered at approved centers in Austria, Canada, France, Germany, Italy, Netherlands, Saudi Arabia, Spain, Switzerland, Turkey, United Kingdom and the United States.

About Second Sight

Second Sight's mission is to develop, manufacture and market innovative implantable visual prosthetics to enable blind individuals to achieve greater independence. Second Sight has developed and now manufactures and markets the Argus® II Retinal Prosthesis System. Enrollment has been completed in a feasibility trial to test the safety and utility of the Argus II in individuals with Dry Age-Related Macular Degeneration. Second Sight is also developing the Orion™ I Visual Cortical Prosthesis to restore some vision to individuals who are blind due to causes other than preventable or treatable conditions. U.S. Headquarters are in Sylmar, California, and European Headquarters are in Lausanne, Switzerland. For more information, visit www.secondsight.com.

Safe Harbor

This press release contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange and Exchange Act of 1934, as amended, which are intended to be covered by the "safe harbor" created by those sections. All statements in this release that are not based on historical fact are "forward looking statements." These statements may be identified by words such as "estimates," "anticipates," "projects," "plans," or "planned," "seeks," "may," "will," "expects," "intends," "believes," "should" and similar expressions or the negative versions thereof and which also may be identified by their context. All statements that address operating performance or events or developments that Second Sight expects or anticipates will occur in the future are forward-looking statements. While management has based any forward looking statements included in this release on its current expectations, the information on which such expectations were based may change. Forward-looking statements involve inherent risks and uncertainties which could cause actual results to differ materially from those in the forward-looking statements, as a result of various factors including those risks and uncertainties described in the Risk Factors and in Management's Discussion and Analysis of Financial Condition and Results of Operations sections of our Annual Report on Form 10-K as filed on March 17, 2015 and our other reports filed from time to time with the Securities and Exchange Commission. We urge you to consider those risks and uncertainties in evaluating our forward-looking statements. We caution readers not to place undue reliance upon any such forward-looking statements, which speak only as of the date made. Except as otherwise required by the federal securities laws, we disclaim any obligation or undertaking to publicly release any updates or revisions to any forward-looking statement contained herein (or elsewhere) to reflect any change in our expectations with regard thereto or any change in events, conditions or circumstances on which any such statement is based. You should however review additional disclosures we make in our registration statement on Form S-1 for this offering that has been filed with the Securities and Exchange Commission, as well as our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K.

[1] The paper was electronically published today prior to publication in Ophthalmology.

[2] Vaidya A, Borgonovi E, Taylor RS, et al. The cost-effectiveness of the Argus II retinal prosthesis in Retinitis Pigmentosa patients. BMC Ophthalmol. 2014;14:49.

[3] 16,000 US Dollars has been calculated from 14,603 Euros noted in the paper based on the conversion rate in July 2016

AMERICAN ACADEMY™ OF OPHTHALMOLOGY

Five-Year Safety and Performance Results from the Argus II Retinal Prosthesis System Clinical Trial

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Purpose: The Argus II Retinal Prosthesis System (Second Sight Medical Products, Inc, Sylmar, CA) was developed to restore some vision to patients blind as a result of retinitis pigmentosa (RP) or outer retinal degeneration. A clinical trial was initiated in 2006 to study the long-term safety and efficacy of the Argus II System in patients with bare or no light perception resulting from end-stage RP.

Design: Prospective, multicenter, single-arm clinical trial. Within-patient controls included the nonimplanted fellow eye and patients' native residual vision compared with their vision with the Argus II.

Participants: Thirty participants in 10 centers in the United States and Europe.

Methods: The worse-seeing eye of blind patients was implanted with the Argus II. Patients wore glasses mounted with a small camera and a video processor that converted images into stimulation patterns sent to the electrode array on the retina.

Main Outcome Measures: The primary outcome measures were safety (the number, seriousness, and relatedness of adverse events) and visual function, as measured by 3 computer-based, objective tests. Secondary measures included functional vision performance on objectively scored real-world tasks.

Results: Twenty-four of 30 patients remained implanted with functioning Argus II Systems at 5 years after implantation. Only 1 additional serious adverse event was experienced after the 3-year time point. Patients performed significantly better with the Argus II on than off on all visual function tests and functional vision tasks.

Conclusions: The 5-year results of the Argus II trial support the long-term safety profile and benefit of the Argus II System for patients blind as a result of RP. The Argus II is the first and only retinal implant to have market approval in the European Economic Area, the United States, and Canada. *Ophthalmology 2016;■ :1–7 © 2016 by the American Academy of Ophthalmology. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)*.

**Supplemental material is available at www.aaojournal.org.*

The last decade has seen a significant number of new retinal treatment paradigms commencing clinical trials. These have included gene therapy,[1] stem cell transplantation,[2] and electronic neural prostheses in different locations in the eye.[3–5] Although all of these approaches hold promise, only retinal prostheses have reached the market for the restoration of some visual function in patients blind as a result of retinitis pigmentosa (RP). The Argus II Retinal Prosthesis System (Second Sight Medical Products, Inc, Sylmar, CA) was the first and remains 1 of only 2 retinal prostheses to be approved for commercialization in the European Economic Area (receiving CE Mark in 2011) and the only prosthesis to date to receive Food and Drug Administration approval for commercialization in the United States (Humanitarian Device Exemption approval in 2013) and to receive Health Canada approval (in 2014).

Thirty patients implanted with the Argus II System for the Argus II feasibility study (clinicaltrials.gov identifier, NCT00407602) are being followed for 10 years in a long-term follow-up clinical study. All enrolled patients now have reached at least 5 years after implantation; this report includes safety and efficacy data for all enrolled patients for that period.

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Methods

The Argus II System

The Argus II Retinal Prosthesis System is a visual prosthesis with implanted and external components (Fig 1). Patients wear a pair of glasses with a small camera mounted in the frame connected via a cable to a video processing unit worn on the belt or on a shoulder strap. Implanted components include a hermetically sealed enclosure for the electronics that, along with a receiving antenna, is secured to the eye with a scleral band and sutures, and an array of 60 electrodes that is inserted into the eye and tacked over the macula. When the system is turned on, the visual information collected by the camera is received, processed, and converted into a brightness map in real time by the video processing unit. Power and data are sent via a radio-frequency telemetry link from an external antenna on the glasses to the receiving antenna on the eye. The brightness values in the video are converted into stimulation current amplitudes on each of the 60 electrodes; activated retinal neurons produce action potentials that travel through the remaining visual system and are perceived as patterns of light by the patients.

Surgical Procedure

The Argus II was implanted in the worse-seeing eye of each patient. The surgical procedure has been reported in detail elsewhere[6,7]; herein, we provide a summary of the main steps. A 360[3] limbal conjunctival peritomy was performed. The receiving coil was inserted under the lateral rectus muscle and extended into the inferotemporal quadrant, whereas the electronics case was placed in the superotemporal quadrant. The scleral band continued under the inferior, medial, and superior rectus muscles. Suture tabs on the implant allowed fixation of the implant to the sclera, and a Watzke sleeve (Labtician Ophthalmics, Inc, Oakville, Canada) and mattress sutures or scleral tunneling secured the scleral band in the nasal quadrants. Core and peripheral vitrectomies were performed, and a temporal sclerotomy of approximately 5 mm was made to allow the introduction of the 60-electrode array into the eye. The array was placed over the macula and tacked to the retina with a custom-made, spring-tension, metallic tack (Second Sight Medical Products, Inc). The trans-scleral passage of the cable was sealed with sutures, and all other sclerotomies were closed. An allograft (processed pericardium; aponeurosis in France) was sutured over the implant to reduce the risk of conjunctival irritation or erosion, and the Tenon's capsule and conjunctiva were closed.

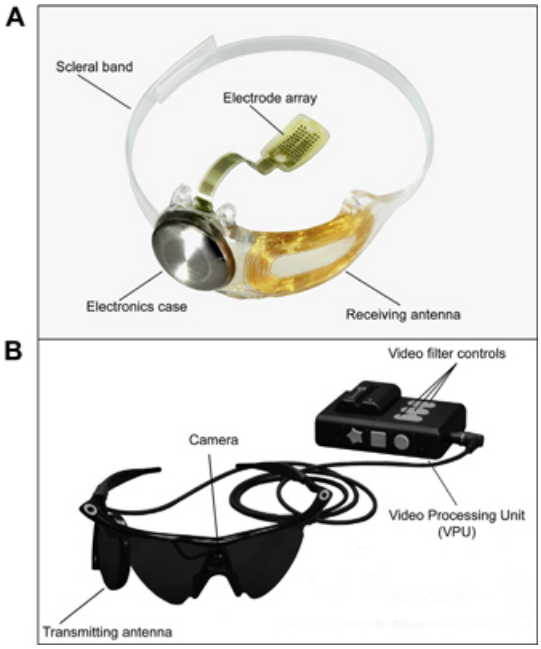

Figure 1. Photographs of the Argus II Retinal Prosthesis System (Second Sight Medical Products, Inc, Sylmar, CA): **(A)** the implanted components of the system and **(B)** the external (body-worn) components of the system.

Study Design

The Argus II clinical trial was a prospective, single-arm, non-randomized study. A sample size of 30 was chosen as sufficient for an analysis of safety and efficacy, taking into account the rarity of the disease under study, RP; estimated prevalence is approximately 1 in 4000 people in developed countries. There were no sham surgeries and all patients were implanted with the Argus II.

Inclusion criteria included: bare light perception or worse vision (>2.9 logarithm of the minimum angle of resolution [logMAR]) in both eyes resulting from profound RP (in the United States) or outer retinal degeneration (in Europe); a history of useful form vision; intact and functioning optic nerve; and 50 years of age or older (later in the trial, this criterion was changed to 25 years or older in the United States and Switzerland and 18 years or older in the United Kingdom and France). Exclusion criteria included: diseases or conditions that may have prevented successful implantation (e.g., axial length out of a certain range) or may have prevented the device from working correctly (e.g., damaged optic nerve function). The trial was and continues to be conducted in accordance with the Declaration of Helsinki and the national regulations for medical device clinical trials in the respective countries where the study is being conducted: the United States, the United Kingdom, France, and Switzerland. The study has been approved by the national ministries of health in these countries and the ethics committees or institutional review boards of participating institutions. All patients signed informed consent to participate. The clinical trial is posted on www.clinicaltrials.gov (where full inclusion and exclusion criteria can be found) under trial registration number NCT00407602.

End Points

The trial end points, summarized here, have been described in detail elsewhere.[6–9] The primary end point for safety was the rate, type, and severity of adverse events (AEs) that were related to the surgery or the device. All AEs were collected and reported as necessary to the relevant authorities and ethics committees and received detailed review and adjudication by an independent medical safety monitor. Serious adverse events (SAEs) were distinguished as a subset of AEs according to the regulatory definition. In this trial, events adjudicated as serious met the criteria of "necessitated medical or surgical intervention to preclude permanent impairment or damage to a body structure" or "required hospitalization or prolonged hospitalization." Nonserious AEs required no treatment or only noninvasive treatment. Thus, a single type of event such as hypotony could be classified as either serious or nonserious depending on how or where it was treated.

Information about device reliability, stability, and robustness over time was gathered by tracking the number of device failures. Data on partial or complete explantation of devices also were captured. Follow-up visits after explantation were performed at 1 day, 1 week, 4 weeks, 3 months, 6 months, and 12 months after explantation except as noted below. Visits after explantation included eye examination, retinal photography, ocular coherence tomography, and fluorescein angiography.

The primary end point for efficacy was visual function, as measured by 3 custom-designed objective assessments. Square localization measured the ability to locate and touch a high-contrast white square of light on a black background on a touch screen monitor; direction of motion assessed patients' ability to determine and indicate the direction of a high-contrast bar that moved across the monitor; and grating visual acuity measured patients' visual acuity using square-wave gratings of different spatial frequencies presented on a computer monitor. All assessments were performed with the Argus II turned on and off (with patients' residual vision only—binocularly for square localization and direction of motion and monocularly for grating visual acuity). Masking of patients was not possible because of the visual and auditory cues produced by the Argus II when turned on.

Square localization and direction of motion were analyzed in terms of their mean error (the difference between the stimulus and response, in centimeters and degrees, respectively). For the analysis as a group, results from all patients were pooled at each time point, such that mean error indicated the overall performance of the group. For individual analyses, a 2-tailed *t* test assuming unequal variances indicated whether the mean error with the system turned on was significantly different from system off for each patient ($P < 0.05$). Grating visual acuity was measured on a scale of 2.9 to 1.6 logMAR. Patients who performed no better than chance at 2.9 logMAR were scored worse than 2.9 logMAR. The percentage of patients who scored better than 2.9 logMAR was compared for the 2 conditions.

Secondary end points included the door task, a real-world assessment in which patients attempted to walk to and touch a large piece of contrasting felt (simulating a door) on a wall; the line task, in which patients followed a white line painted on black tiles; the mass of activity inventory, a questionnaire designed to measure changes in functional vision; the functional low-vision observer-rated assessment, an assessment performed by trained low-vision rehabilitation specialists; and the vision-related quality of life questionnaire, designed to measure the quality of life of those with vision impairments. The functional low-vision observer-rated assessment and vision-related quality of life questionnaire were performed only through postimplant year 3 (as per the clinical trial protocol), and the functional low-vision observer-rated assessment has been described and reported elsewhere.[10,11] The activity inventory was not validated fully in this patient population (e.g., with very low-vision patients), and as such, the data are not included in this report. The door and line tasks were scored by percent success, that is, the mean percent of correct responses (touching the door or ending at the line) for the system on and off was calculated over the group.

Results

Patient Demographics

Enrollment of 30 patients at 10 centers was completed in 26 months (between June 2007 and August 2009), including a pause in enrollment of approximately 6 months after the first 15 patients were implanted. Basic demographics are shown in Table 1.

Table 1. Demographics of Enrolled Participants

No. of participants	30
Retinitis pigmentosa, no.	29 (including 1 LCA)
Choroideremia, no.	1
BLP, no.	29
NLP, no.	1
Gender, no.	
Female	9
Male	21
Mean age ± SD at time of implantation, yrs	58±10
Age range at time of implantation, yrs	28–77
Years since diagnosis at time of implantation, mean ± SD	35.23±11.7
Years of BLP at time of implantation, mean ± SD (n = 15)	15.9±37.9

BLP = bare light perception; LCA = Leber Congenital Amaurosis;
NLP =no light perception; SD = standard deviation.

Patients Lost to Follow-up

No patients were lost to follow-up completely as of 5 years after implantation. However, the number of patients included in the analysis of safety and efficacy did decline over time. Safety data were gathered to 5 years for 27 patients, with drop-out occurring for explanted patients at 1.2 years, 3.5 years, and 4.3 years. Performance data were gathered for 21 or 20 patients at 5 years after implantation as described later.

Safety

Previous reports presented SAE data at 1 year and 3 years after implantation.[6,7] Here, we reprint the 0- to 3-year cumulative SAE rates and report SAEs that occurred up to 5 years after implantation (Table 2). As of 5 years after implantation, 60% of patients (18/30) had experienced no device- or surgery-related SAEs. There were 24 SAEs among 12 patients. (See Table S1, available online at www.aaojournal.org, for SAE occurrences per post-implant year.)

All SAEs were treatable with standard ophthalmic approaches, and there were no lost eyes (enucleated) in the study. As shown in Table 2, only 1 additional SAE had occurred up to year 5 since the last analysis at 3 years after implantation. A rhegmatogenous retinal detachment was noted in the implanted eye of 1 patient during a routine follow-up visit approximately 4.5 years after implantation. The detachment remained stable for more than 1 year, when neovascular glaucoma associated with rubeosis was noted. Medication did not decrease the intraocular pressure. Thus, the patient underwent a pars plana vitrectomy, removal of an epiretinal membrane, fluid–air exchange, and injection of silicone oil. Two weeks after surgery, the intraocular pressure returned to normal and the rubeosis and retinal detachment resolved. One patient died at 6 years after implantation of natural causes unrelated to the Argus II.

Device Reliability and Stability

As of 5 years after implantation, 2 Argus II implants had failed, both because of a progressive loss of ability to maintain the radio-frequency link between the external antenna on the glasses and the receiving antenna implanted on the eye. Both devices failed at approximately 4 years after implantation. The failures are believed to be the result of a gradual exposure of a portion of the receiving antenna, possibly because of damage during surgery. The devices remained implanted to continue collecting long-term safety data for the duration of the clinical trial; thus, the root causes cannot be confirmed at this time.

Table 2. Serious Adverse Event Rates (Cumulative) to 3 and 5 Years after Implantation

	Year 3		Year 5	
Serious Adverse Event Type	No. (%) with Serious Adverse Event	95% Confidence Interval	No. (%) with Serious Adverse Event	95% Confidence Interval
Conjunctival erosion	4 (13.3)	3.1–30.7	4 (13.3)	3.1–30.7
Hypotony	4 (13.3)	3.1–30.7	4 (13.3)	3.1–30.7
Conjunctival dehiscence	3 (10.0)	2.1–26.5	3 (10.0)	2.1–26.5
Presumed endophthalmitis	3 (10.0)	2.1–26.5	3 (10.0)	2.1–26.5
Retack	2 (6.7)	0.8–22.1	2 (6.7)	0.8–22.1
Retinal detachment				
Rhegmatogenous	1 (3.3)	0.1–17.2	2 (6.7)	0.8–22.1
Tractional and serous	1 (3.3)	0.1–17.2	1 (3.3)	0.1–17.2
Retinal tear	1 (3.3)	0.1–17.2	1 (3.3)	0.1–17.2
Uveitis	1 (3.3)	0.1–17.2	1 (3.3)	0.1–17.2
Keratitis, infective	1 (3.3)	0.1–17.2	1 (3.3)	0.1–17.2
Corneal melt	1 (3.3)	0.1–17.2	1 (3.3)	0.1–17.2
Corneal opacity	1 (3.3)	0.1–17.2	1 (3.3)	0.1–17.2
Total	23		24	

Device Explantations

There were 3 complete or partial explantations. In 1 patient, as previously reported,[7] the implant was removed at 14 months to resolve recurrent conjunctival erosion. Two additional patients requested that their devices be explanted at 3.5 and 4.3 years after implantation. One of these patients had experienced 2 conjunctival erosions that were treated by resuturing the device and closing the conjunctiva. A third instance of conjunctival erosion occurred and the patient chose explantation rather than undergoing a third revision surgery. The entire implant was removed with no serious adverse sequelae. This patient completed follow-up after explantation through 3 months and withdrew study consent at that point. The other patient experienced chronic hypotony and ptosis in the implanted eye and chose explantation for aesthetic reasons and to avoid additional revision surgeries. During the explantation procedure, the cable was cut mid vitreous, the sclerotomy was sutured completely closed, and the extraocular portion of the device and the proximal portion of the cable were removed. The array was left tacked to the retina. No AEs occurred after explantation.

Visual Function

Mean results over time for visual function tasks are shown in Figure 2. The number of patients included in the analysis for each time point is indicated in the axis label. Square localization and direction of motion were introduced partway through the study, so baseline and year 1 follow-up results do not represent a complete data set. Later time points also include fewer patients because of the explantations and device failures described above, as well as a few instances of missed protocol visits in years 4 and 5. Missed visits were the result of health reasons (n = 1), method deviation (n = 1), and consent to safety follow-up only after year 3 or 4 (n = 2). One additional patient did not complete the direction of motion, line task, or door task at year 5 because of fatigue.

As a group, patients perform better on the square localization test with the system on (lower mean error) than when using their residual vision at all time points (Fig 2A). Direction of motion, a more challenging assessment, also showed overall improvement (lower mean error) with the system on at all time points (Fig 2B). Grating visual acuity, the most difficult assessment, also revealed better performance with the system on; with the system off, all results were worse than 2.9 logMAR at yearly time points. With the system on, 27% to 48% of patients scored 2.9 logMAR or better (Fig 2C), depending on the time point.

The patients' improvements when using the system compared with their residual vision also can be seen on an individual basis, in terms of the percentage of patients who performed significantly better with the system on than off on each assessment. Results at 1 year and 3 years were reported previously; here, the year 3 and year 5 results are compared (Table 3).

Functional Vision

The mean percent success for the orientation and mobility assessments is shown in Figure 3. Performance on the door task was better with the system on than off at all time points (Fig 3A). Similarly, patients' ability to follow a white line on the floor was much improved when using the system compared with using only their residual vision (Fig 3B).

Discussion

The Argus II was granted regulatory approval in the Euro-pean Economic Area in 2011 and in the United States in 2013 on the basis of earlier results from this clinical trial. However, the original study patients will continue to be followed up out to 10 years to collect very long-term data on the safety and efficacy of this chronically implanted device. Long-term data are ever more important given that the device is becoming available to increasingly large numbers of patients with RP and similar disorders worldwide.

The data from the original group of 30 patients—15 of whom received an earlier design of the device before minor improvements were made—dcontinue to show clear reliability, safety, and long-term efficacy out to 5 years after implantation. Twenty-four devices remain implanted and functioning. The device stability remains good with only 2 device failures, both of which remain safely implanted but nonfunctional, and 3 explanted devices from among 30 implanted patients. Of the 3 explantations, 1 was carried out to resolve recurrent conjunctival erosion and chronic hypotony. The other 2 explantations were elected by the patients. Although elective, these 2 explantations were prompted by a cascade of SAEs in each patient that have been documented previously.[7] In these cases, the patients chose explantation rather than further revision surgeries to address recurrent SAEs. One patient died during the trial.

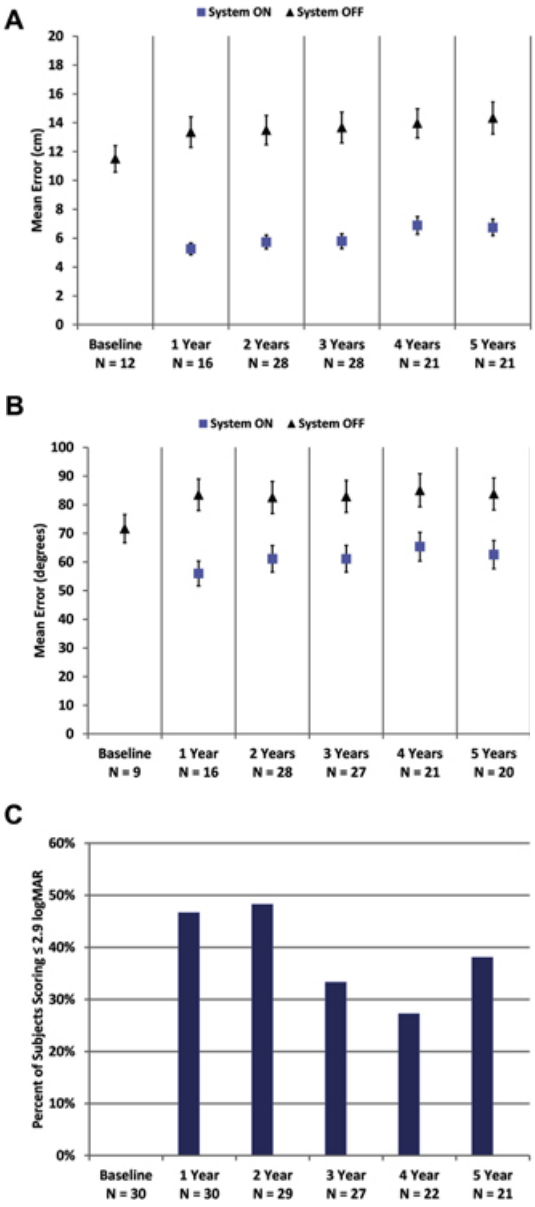

Figure 2. Graphs showing results for **(A)** square localization, **(B)** direction of motion, and **(C)** grating visual acuity at yearly time points. **A**, **B**, Mean error with the system on is shown as blue squares; mean error with the system off (with residual vision only) is shown as black diamonds. Error bars indicate standard error. **C**, The percent of patients scoring 2.9 logarithm of the minimum angle of resolution (logMAR) or better on grating visual acuity with the system on (in the implanted eye) are shown at each time point. There were no patients who scored 2.9 logMAR or better with the system off in the implanted eye.

Table 3. Individual Visual Function Assessment Results

Visual Function Assessment	Year 3		Year 5	
	No.	Significantly Better On Than Off (%)	No.	Significantly Better On Than Off (%)
Square localization	28	89.3	21	80.9
Direction of motion	27	55.6	20	50
Grating visual acuity	27	33.3	21	38.1

Only 1 new SAE developed between 3 and 5 years after implantation, a rhegmatogenous retinal detachment that was treated successfully and resolved. There were no lost eyes and there was no damaged residual vision in the study. However, it is clear that any chronic implant in the eye carries a continual risk of SAEs. Although outside the scope of this article, additional instances of SAEs were found in 4 patients after the 5-year time point. In 2 patients, these represented recurrences or worsening of previous SAEs; in 2 patients, they were new events (conjunctival erosion and subsequent endophthalmitis in 1 patient, and a rhegmatogenous retinal detachment in another patient). These will be reported in a future article when the dataset is complete and events have been adjudicated. Therefore, it is critical for any patient considering being implanted with the Argus II to understand the long-term and ongoing risks; both the patient and his or her ophthalmologist must commit to at least a yearly evaluation of eye health for as long as the Argus II remains implanted.

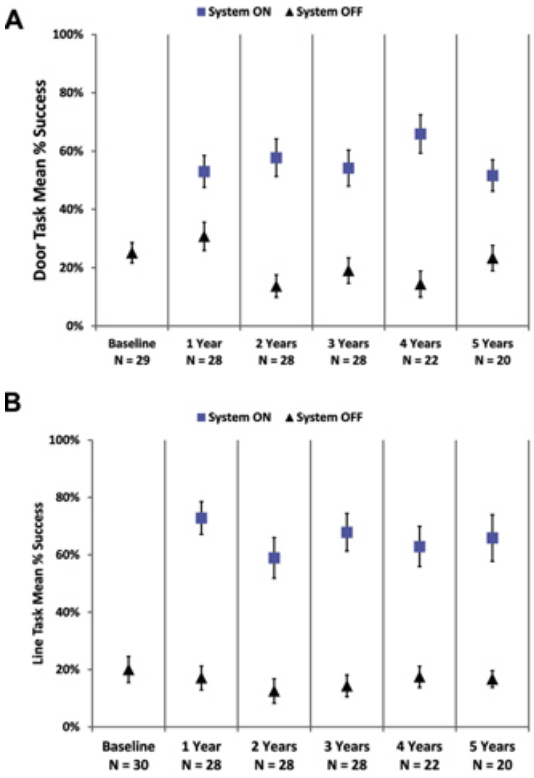

Figure 3. Graphs showing the mean percent success on **(A)** the door task and **(B)** the line task with the system on (blue squares) and off (residual vision only, black triangles). Error bars indicate standard error of the mean.

Results on a battery of visual function and functional vision assessments indicated continued efficacy of the Argus II out to 5 years after implantation. Patients are still able to locate objects, determine the direction of motion of a moving bar, and perform an acuity task better with the system on than when using only residual vision. The 5-year visual function results are similar to those seen at 3 years, particularly when considering the individual analysis data (e.g., 33% of patients performed grating acuity better with the system on than off at 3 years, and 38% did so at 5 years). Functional vision performance likewise showed sustained improvement with the system on out to 5 years after implantation. It should be noted that 9 to 10 patients did not participate in efficacy testing during the 5-year follow-up period as discussed previously. The resulting smaller numbers may have led to bias in the results at later time points. This potential bias will be evaluated in future reports, such as those on the postapproval studies currently in progress.

In conclusion, as of October 15, 2015, more than 200 patient-years of data had been collected on the 30 patients implanted with the Argus II Retinal Prosthesis System. The longest implant duration to date is 8.4 years, and this device as well as 23 others continue to function, reliably enhancing basic visual function for these patients who otherwise can see almost nothing. The outcome of the functional tests described in this report and the acceptable safety profile of the Argus II in this clinical trial led to its regulatory approval in the European Union, the United States, and Canada. The device has gone on to be implanted in many patients; in many countries, it remains the only currently available treatment for profound vision loss resulting from RP and outer retinal dystrophy. These new long-term data from the original study continue to demonstrate that this therapy remains an option for patients with RP and may allow for stable and reliable restoration of some basic visual function.

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Footnotes and Financial Disclosures

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Abbreviations and Acronyms:

AE = adverse event; **LCA =** Leber Congenital Amaurosis; **logMAR =** logarithm of the minimum angle of resolution; **RP =** retinitis pigmentosa; **SAE =** serious adverse event.

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