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NIIOS Newsletter

Netherlands Institute for Innovative Ocular Surgery

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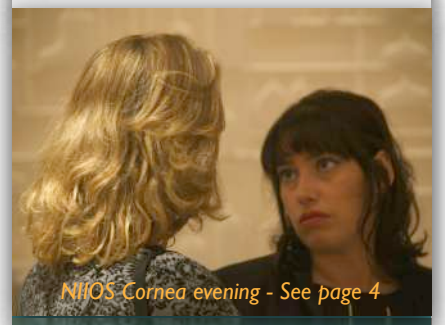


NIIOS Cornea evening - See page 4

REFERRALS TO MELLES CORNEA CLINIC ROTTERDAM

For referrals to Melles Cornea Clinic Rotterdam, please use the referral form enclosed, or download it from www.niios.com. Please fax the referral form to +31 10 297 4440 and one of our international secretaries will make further arrangements.

To contact us by e-mail, please write to info@corneaclinic.nl.

NIIOS optometrist Korine van Dijk completes PhD thesis on treatment of keratoconus

Minimizing surgical risk & stabilizing the visual acuity in advanced keratoconus

How should we manage keratoconus?

"There is a wide variety in keratoconus treatments available, depending on disease stage as well as the tendency for progression. Contact lens fitting is still the first step for the correction of surface irregularity and improvement of the visual acuity. However, lens fitting does not stop progression and therefore a surgical treatment may be offered in a relatively early stage to stabilize the cornea, for example with UV-crosslinking. Corneal ring segments may also be considered but the overall results may be disappointing due to instability of the implant or progression of the disease."

Till what point do we stick with contact lenses?

"In the past years, a lot has changed in the field of contact lens design and fitting, as well as in the number of surgical treatment options. So much has changed that keratoconus has slowly developed in a corneal subspecialty with the resonating theme 'how to find the balance between managing the two major problems in keratoconus': on the one hand the reduced visual acuity due to corneal surface irregularity and on the other hand the tendency for progression."

'Isolated Bowman layer transplantation' may now be the safest treatment for advanced keratoconus

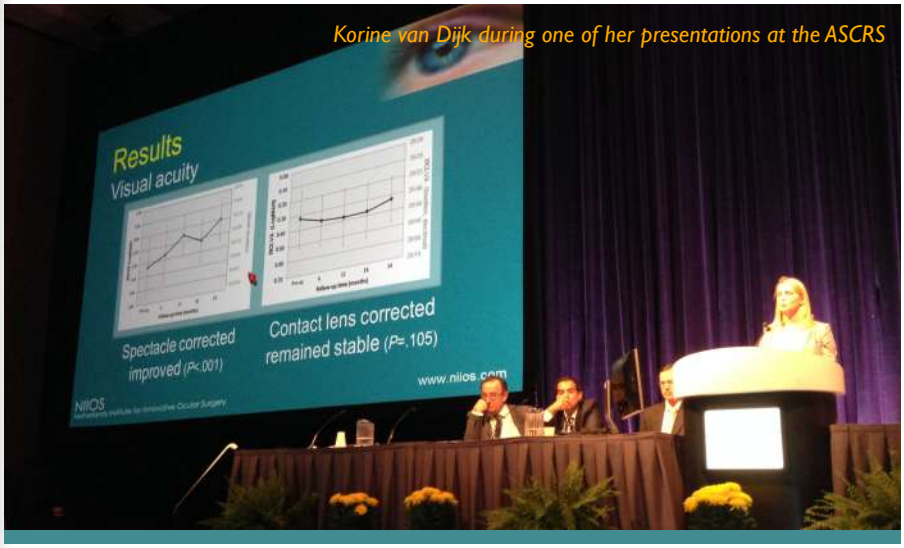
How well does UV-crosslinking work out?

"Our clinic has all the necessary equipment and regularly performs UV-crosslinking procedures. However, the number of procedures is lower than anticipated because quite a few eyes seem to stabilize by themselves after recommending the patient 'not to rub their eyes'. This 'advice' proved so effective that our entire treatment protocol now hinges on patient education. Only those eyes that show progression are eligible for UV-crosslinking, but it is remarkable how perhaps the most effective treatment in keratoconus, verbally instructing the patient, is hardly communicated."

'Don't rub' is quickly learned?

"'Not to rub' is only part of the story, because you have to explain why that is important and at the same time, you need to eliminate the trigger for patients to rub their eyes, otherwise such advice is doomed to fail. Such triggers can vary substantially and may be ranging from allergies, to a neurotic 'tic', neurological disease, various syndromes, dry eyes, or just an uncorrected refractive error. With all these causes, patients may be caught in a vicious circle, because giving in to rubbing quickly gives relieve but worsens the situation in the longer term.

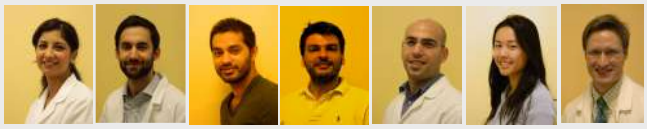
Continued on page 2



Korine van Dijk during one of her presentations at the ASCRS

Please note our NIIOS LinkedIn profile, with information on publications and upcoming meetings

Corneal & Research fellows 2015-2016



From left to right: Zainab Baksoellah, Netherlands; Thomas Müller, Switzerland; Abbas Ilyas, Netherlands; Daniele Spinozzi, Italy; Itay Lavy, Israel; Shugi Hsien, Netherlands; Jack Parker, United States

NIIOS scientific articles 2015-2016

2016

- Baydoun L, Livny L, Ham L, Bruinsma M, Melles GRJ. 360o Scheimpflug imaging as a predictive tool for an upcoming allograft rejection after Descemet membrane endothelial keratoplasty. Cornea. Accepted.
- Müller T, Lavy, Baydoun L, Lie JT, Dapena I, Melles GRJ. Case Report of Quarter-DMEK for Fuchs Endothelial Dystrophy. Cornea. Accepted.
- Luceri S, Baksoellah Z, Ilyas A, Baydoun L, Melles GRJ. Interface fluid syndrome after Laser in situ Keratomileusis (LASIK) due to Fuchs endothelial dystrophy reversed by Descemet membrane endothelial keratoplasty (DMEK). Cornea. Accepted.
- Groeneveld-van Beek EA, Parker J, Lie J, Bourgonje V, Ham L, van Dijk K, van der Wees J, Melles GRJ. Donor tissue preparation for Bowman layer transplantation. Cornea. Accepted.
- Luceri S, Parker J, Dapena I, Baydoun L, Oellerich S, van Dijk K, Melles GRJ. Corneal densitometry and higher order aberrations after Bowman Layer Transplantation: 1 year results. Cornea 2016;35:959-66.
- Fernandez-Lopez E, Baydoun L, Gerber-Hollbach N, Dapena I, Liarakos VS, Ham L, Melles GRJ. Re-bubbling techniques for graft detachment after Descemet membrane endothelial keratoplasty. Cornea 2016;35:759-64.
- Gerber-Hollbach N, Parker J, Baydoun L, Liarakos VS, Ham L, Dapena I, Melles GRJ. Preliminary outcome of hemi-Descemet membrane endothelial keratoplasty for Fuchs endothelial dystrophy. Br J Ophthalmol. Accepted.
- Satué M, Ham L, Liarakos VS, Baydoun L, Hillenaar T, Bruinsma M, Melles GR. 'Salt and pepper endothelium' recurring after Descemet membrane endothelial keratoplasty (DMEK). Cornea 2016;35:683-5.
- Baydoun L, Melles GRJ. Terminology on graft failure needs refinement in reports on endothelial keratoplasty outcomes. JAMA Ophthalmol 2016;134:125-6.
- Rodríguez-Calvo de Mora M, Groeneveld-van Beek EA, Frank LE, van der Wees J, Oellerich S, Bruinsma M, Melles GRJ. Graft storage time and donor age relate to endothelial cell density decrease and graft adherence after Descemet Membrane Endothelial Keratoplasty (DMEK). JAMA Ophthalmol 2016;134:91-4.
- Lie JT, Lam FC, Groeneveld-van Beek EA, van der Wees J, Melles GRJ. Graft preparation for Hemi-Descemet membrane endothelial keratoplasty (Hemi-DMEK) - A method for preparing two endothelial grafts from a single donor cornea. Br J Ophthalmol 2016;100:420-4.

2015

- Peraza Nieves J, Luceri S, van Dijk K, Yeh RY, Dapena I, Melles GR. Bowman layer transplantation in advanced keratoconus. Images en Ophtalmologie 2015;7:252-6.
- Dapena I, Baydoun L, Luceri S, Peraza J, Yeh RY, Bruinsma M, Melles GR. DMEK and future approaches for treating endothelial diseases. Images en Ophtalmologie 2015;6:203-6.
- Tong CM, Gerber-Hollbach N, Peraza Nieves J, Liarakos V, Baydoun L, Dapena I, Melles GRJ. "No-touch" DMEK surgical technique. Vision Pan-America 2015;14:72-6.
- Liarakos VS, Satué M, Livny E, van Dijk K, Ham L, Baydoun L, Dapena I, Melles GR. Descemet membrane endothelial keratoplasty for a decompensated penetrating keratoplasty graft in the presence of a long glaucoma tube. Cornea 2015;34:1613-6.
- Baydoun L, Ham L, Borderie V, Dapena I, Hou J, Frank LE, Oellerich S, Melles GRJ. Endothelial survival after Descemet membrane endothelial keratoplasty: Effect of surgical indication and graft adherence status. JAMA Ophthalmol 2015;133:1277-85.
- Fernández-López E, Miron A, Pogorelova S, Oganesyan O, Baydoun L, Melles GRJ. A case of severe corneal flattening after Descemet stripping endothelial keratoplasty (DSEK). Eur J Ophthalmol 2015;26(1):e4-7.
- Lam FC, Baydoun L, Satué M, Dirisamer M, Ham L, Melles GRJ. One year outcome of hemi-DMEK membrane endothelial keratoplasty. Graefes Arch Clin Exp Ophthalmol 2015;253:1955-8.
- Melles GRJ. April consultation #3. J Cataract Refract Surg 2015;41:896-7.
- Fernández López E, Lam FC, Bruinsma M, Baydoun L, Dapena I, Melles GRJ. Fuchs endothelial dystrophy: current treatment recommendations and new experimental surgical options. Exp Rev Ophthalmol 2015;10:301-12.
- Parker JS, van Dijk K, Melles GRJ. Treatment options for advanced keratoconus: A review. Surv Ophthalmol 2015;60:459-80.
- Monnereau C, Dapena I, Melles GRJ. Reply to "Descemet's Membrane Endothelial Keratoplasty (DMEK): To do or not to do?". JAMA Ophthalmol 2015;133:725.
- Satué M, Rodríguez-Calvo-de-Mora M, Naveiras M, Cabrerizo J, Dapena I, Melles GRJ. La estandarización en el trasplante endotelial de membrana de Descemet (DMEK): Resultados de las primeras 450 cirugías (standardization of the Descemet membrane endothelial keratoplasty technique (DMEK): outcomes of the first 450 consecutive cases). Arch Soc Esp Oftalmol 2015;90:356-64.
- Parker J, Konder R, van Dijk K, Melles GRJ. Toward safer treatment options for advanced keratoconus. US Ophthalmic Review 2015;8:33-4.
- Baydoun L, van Dijk K, Dapena I, Musa FU, Liarakos VS, Ham L, Melles GRJ. Repeat Descemet membrane endothelial keratoplasty after complicated primary Descemet membrane endothelial keratoplasty. Ophthalmology 2015;122:8-16.
- Lie JT, Monnereau C, Groeneveld-van Beek EA, van der Wees J, Frank J, Bruinsma M, Melles GRJ. Dehydration of corneal anterior donor tissue with polyethylene glycol (PEG)-enriched media. Cell Tissue Bank 2015;16:399-409.
- Rodríguez-Calvo-de-Mora M, Quilendrino R, Ham L, Liarakos VS, van Dijk K, Baydoun L, Dapena I, Oellerich S, Melles GRJ. Clinical outcome of 500 consecutive cases undergoing Descemet membrane endothelial keratoplasty. Ophthalmology 2015;122:464-70.
- Konder R, Baydoun L, Dirisamer M, Ciechanowski P, Oellerich S, Melles GRJ. Descemet Membran Endothelkeratoplastik (DMEK) und/oder Phakoemulsifikation in phaken Augen mit Hornhautendotheldystrophie. Spektrum Augenheilkd 2015;29:19-24.
- van Dijk K, Liarakos VS, Parker J, Ham L, Lie JT, Groeneveld-van Beek EA, Melles GRJ. Bowman layer transplantation to reduce and stabilize progressive, advanced keratoconus. Ophthalmology 2015;122:909-17.

Continued from page 1

Why then still consider surgery?

"The biggest challenge may be the group with advanced keratoconus because, irrespective of the cause, the risk of progression is always high. The cornea is often too thin for UV-crosslinking and these patients are in a bad spot when contact lens intolerance develops. Most often people are young and they can manage themselves perfectly with hard (scleral) contact lenses, but when corneal steepening leads to contact lens intolerance, it has a major impact on their daily activities, not to mention their future perspectives. When convicted to wearing spectacles, this group finds themselves among the legally blind owing to the irregular astigmatism, and all normal daily tasks like driving a car or reading become problematic."

So you offer a transplant then?

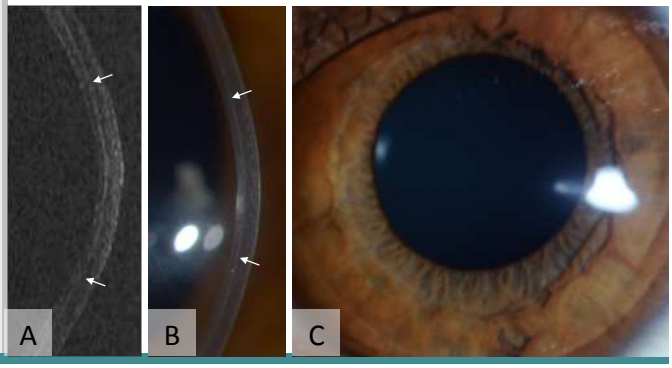
"That is usually the next step. A transplant usually provides improvement. In the past, penetrating keratoplasty was performed and today we have more targeted techniques like deep anterior lamellar keratoplasty (DALK) that minimize the risk of allograft rejection. But all these corneal tissue replacement techniques are characterized by slow recovery and substantial risks of severe complications, especially in the long term in a patient group that is relatively young. And if you think about it, the reason for performing keratoplasty here is only to manage contact lens intolerance, which is like shooting a mosquito with a cannon."

So that is your argument for Bowman layer transplantation?

"Exactly. After virtually any type of corneal transplant, contact lens wear is still indicated to correct postkeratoplasty astigmatism. So the main thing you want to achieve in keratoconus eyes is reversal of the contact lens intolerance, allowing patients to take up their normal daily activities with a visual acuity level they are used to, without visual handicap that is. With this goal in mind, NIIOS has developed the concept of 'isolated Bowman layer' transplantation, the implantation of a 10 micron thick donor Bowman layer, that is positioned in a mid-stromal pocket and that serves as a splint to flatten the cornea with about 8 diopters and to halt disease progression. Since only a thin layer of tissue is 'added' to the keratoconus cornea and both the anterior and posterior surfaces are left intact, virtually all intra- and postoperative complications are eliminated. And if it fails, the donor tissue can be easily removed and all keratoplasty options are still on the table. However, in our patient group a secondary keratoplasty was needed in less than 10% of eyes, so that the far majority of patients with advanced keratoconus could be managed with selective Bowman layer transplantation, which may be a long term solution for them, while minimizing the surgical risk because it is not really an 'intraocular' operation and far less invasive compared to other types of keratoplasty."

Van Dijk K, Liarakos VS, Parker J, Ham L, Lie JT, Groeneveld-van Beek EA, Melles GRJ. Bowman layer transplantation to reduce and stabilize progressive, advanced keratoconus. Ophthalmology. 2015;122:909-17

'Optical coherence tomography' (A) and slit-lamp photos (B, C) six months after 'isolated Bowman layer' transplantation (arrows).



European collaborative project 'Tools and Technologies for Advanced Therapies' in search of more efficient use of donor corneal tissue

NIIOS receives EU-grant 'Horizon 2020'

In the past decades, NIIOS has introduced various surgical techniques for corneal transplantation as an alternative to conventional penetrating keratoplasty. The introduction of these so-called 'minimally invasive techniques' also had an effect on the eye banking process, because the use of more advanced lamellar keratoplasty techniques also broadened the possibilities for preparing donor tissue more efficiently. Until recently, one donor cornea was used for one recipient eye, which implied a fairly laborous path for an eye bank to facilitate one single surgery. Modern lamellar keratoplasty techniques now allow for 'double use' of a cornea, since different tissue layers can be used for different surgeries (eg. DALK & DMEK) or tissue layers may be further divided (eg. Hemi-DMEK). And recent technological and cell biological developments may further widen the scope of preparing transplants, for example with new concepts like 'printing' tissue with a 3D printer, or growing tissues in cultures, or combinations thereof.

The costs of such cell biological techniques are relatively high, so NIIOS submitted a joined EU-grant application with other centers (among which the Linköping University in Sweden; the Aarhus University in Denmark; and the Linz Eye Bank in Austria), which was recently granted.

NIIOS investigator Alina Miron is one of the scientists working on the Horizon 2020 project

NIIOS medical team with Mr. Reijers, the first DMEK patient worldwide, in Rotterdam, May 2016

First DMEK patient
10 years after surgery

10 year DMEK

Mr. Reijers never seeked to become a celebrity, but he has been traveling the world to show his eyes to ophthalmologists, since he underwent bilateral DMEK in 2006.

Any regrets about your DMEKs?

No! My eyes are doing exceptionally well, I am seeing 20/18 (1.2) and I still feel very grateful that my eye doctor referred me to Melles Cornea Clinic, when it was just opening its doors! Lucky me!

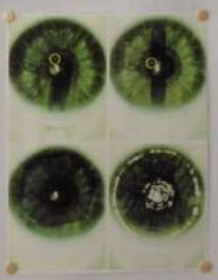
Dr. Jan Worst predicted at the 1998 ARVO that it would take DMEK 20 years to take off

First DMEK abstract at 1998 ARVO meeting

Transplantation of Descemet's membrane carrying viable endothelium through a small scleral incision

G.R.J. Melles, F.J.R. Rietveld, E. Pels, W.H. Beekhuis, P.S. Binder
Cornea-service, Rotterdam Eye Hospital; Dept of Pathology, University of Nijmegen; Ophthalmic Research Institute, Amsterdam; Vision Surgery and Laser Center, San Diego

Posterior corneal disorders, including PPBK and Fuchs' endothelial dystrophy, account for about one third of all indications for a penetrating keratoplasty (PKP). Compared to full-thickness PKP, less surgically induced astigmatism, and fewer suture-related and wound healing related complications may be expected when Descemet's membrane (DM) with the endothelium is transplanted. The purpose of our study was therefore to design a technique for transplantation of DM carrying viable endothelium, while leaving the entire anterior cornea (stroma, Bowman's layer and epithelium) intact.



Materials and methods (human eye bank eye model):

Donor:
- Dissection of 9.0 mm diameter DM

Recipient:
- 5.0 mm scleral tunnel
- 8.0 mm 'Descemeto-rhexis'
- Implantation donor DM
- Fixation of donor DM

Results:
- Postoperative astigmatism: 1.0 +/- 0.6 D
- Donor endothelial cell damage < 5-10%
- Normal endothelial cell morphology (TEM)

Potential advantages of DM transplantation:
- Less surgical time
- Less intraoperative risks
- More efficient use of donor tissue
- Fewer follow-up visits
- Faster visual recovery
- Less final astigmatism
- Less risk of wound dehiscence

Unanswered questions:
- Donor endothelial cell damage?
- Luxation of implanted donor DM?
- Less astigmatism compared to PKP?

Conclusion:

Transplantation of DM carrying viable endothelium can be performed through a small scleral incision, in a human eye bank eye model. Compared to "posterior lamellar keratoplasty" (IOVS 1997;38(suppl):4367), transplantation of DM may be a faster, but technically more difficult technique, due to barely visible and fragile donor tissue.

Acknowledgements:
- Cornea bank of Netherlands Ophthalmic Research Institute, Amsterdam
- Bio Implant Services, Leiden

Sponsors:
- Loenen Martinet Corneal Fellowship from 'de Rotterdamse Vereniging voor Blindenbelangen'
- Eye Bank Association of America (travel fellowship grant)

First poster on DMEK as presented 18 years ago at the 1998 ARVO meeting in Fort Lauderdale, Florida, May 1998.

Attendees of NIIOS Cornea evening in Barcelona, preceding the 2015 ESCRS

Dr. Dapena with a fellow and session coordinator Dr. Lisanne Ham during a live-video streaming session

Save the date: Friday September 9th 2016, 7.00pm,
at the Radisson Blue Royal Hotel in Copenhagen

NIIOS Cornea evening preceding 2016 ESCRS

Just like last year, a NIIOS meeting on the latest topics in keratoplasty surgery is organized on the Friday evening preceding the upcoming ESCRS. Among the speakers are Drs. Francis Price, John Parker, Kathryn Colby, Greg Moloney, Alain Saad, and NIIOS staff members and fellows. Topics include: 'Descemetorhexis only' for Fuchs dystrophy, 10 year DMEK outcomes, DMEK complication management, and Bowman layer transplantation for advanced keratoconus. Free entrance tickets are available thru info@niios.com or register at www.niios.com/CorneaEvening2016.

Two-day advanced keratoplasty wetlab courses in Rotterdam and in Birmingham (US)

Bowman layer transplantation for advanced keratoconus & Descemet membrane endothelial keratoplasty (DMEK)

Each course is scheduled on a Tuesday/ Wednesday. On Tuesdays, the course participants join live surgery sessions; on Wednesday, various techniques are practised during educational wetlab sessions and patient demonstrations.

Further information and applications: dekort@niios.com

In Rotterdam:

- ☞ ***Advanced*** DMEK surgical course: August 25, 2016
- ☞ ***Beginner*** DMEK surgical course: Sept. 6/7, 2016 *(before ESCRS)*
- ☞ ***Beginner*** DMEK surgical course: Oct. 11/12, 2016
- ☞ ***Beginner*** DMEK surgical course: Nov. 8/9, 2016
- ☞ ***Beginner*** Bowman layer transplant surgical course: Nov. 10, 2016

In Birmingham, Alabama:

- ☞ ***Beginner*** DMEK surgical course: November Fri./Sat. 18/19, 2016

For US surgeons!

During wetlab courses in the United States, NIIOS surgeons as well as eye bank technicians from Amnitrans Eye Bank Rotterdam will be present for teaching purposes

Course level: Corneal fellows and surgeons

Live-video streaming of DMEK surgeries performed in Rotterdam

Descemet membrane endothelial keratoplasty (DMEK)

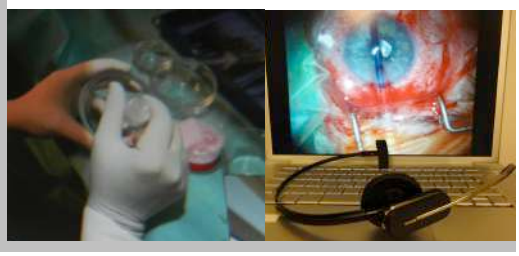
Sessions are scheduled on Thursdays from 9am thru 4pm (+1h Greenwich Time).

Participants receive live images of the surgical microscope and side tables, and can chat (verbally or by typing) with the surgical staff during surgery.

Further information and applications: info@niios.com

- ☞ DMEK live-video stream: Sept. 1, 2016
- ☞ DMEK live-video stream: Oct. 13, 2016
- ☞ DMEK live-video stream: Nov. 3, 2016

Level: Corneal fellows and surgeons



NIIOS textbook on DMEK available through info@niios.com

'Special Interest Group' for ophthalmologists who want to start with advanced lamellar keratoplasty (eg. Descemet membrane endothelial keratoplasty (DMEK) and isolated Bowman layer transplantation for advanced keratoconus)

SIGOTT for updated info on advanced keratoplasty

In recent years, there has been a growing interest in keratoplasty surgical techniques developed by the Netherlands Institute for Innovative Ocular Surgery (NIIOS), like DALK, DLEK, DSEK, DMEK, and Bowman layer transplantation. To accommodate all requests for information, a Special Interest Group for Ocular Tissue Transplantation was founded for all eye professionals with an interest in corneal surgery or eye banking techniques. Membership is free of charge and an application for membership can be submitted via info@sigott.com.

☞ *For more information, please visit: www.sigott.com*

SIGOTT
Special Interest Group for Ocular Tissue Transplantation