Publications on Tutopatch®

Clinical Neurosurgery

ARTS MP ET AL.
Surgical treatment of idiopathic transdural spinal cord herniation: a new technique to untether the spinal cord
Acta Neurochir (Wien), 148; 2006
Two case reports of the successful use of Tutopatch for the closure of anterolateral defects of the spinal dura. Tutopatch was wrapped around the spinal cord and fixed with fibrin glue.

BAUMANN I ET AL.
Ossifying fibroma of the ethmoid involving the orbit and the skull base
Otolaryngol Head Neck Surg, 133(1); 2005
Case report. Tutopatch was used to reconstruct the skull base after tumor resection.

FILIPPI R ET AL.
Bovine pericardium for duraplasty: clinical results in 32 patients
Neurosurg Rev, 24; 2001
Tutopatch was used for duraplasty in 32 patients. No complications attributable to the graft occurred. The authors conclude: solvent preserved bovine pericardium should be recommended as a safe, suitable, and cost-effective material for duraplasty.

GÜRER B ET AL.
Use of the bovine pericardial patch and fibrin sealant in meningomyelocele closure
Acta Neurochir (Wien), 156(7); 2014
Eight meningomyelocele patients were treated with Tutopatch and fibrin sealant technique at the fascial level-between the dural sac and the skin. Stable coverage was achieved and none of the possible complications was observed postoperatively.

MUSSACK T ET AL.
Bilateral decompressive craniectomy due to intracranial hypertension during acute posttraumatic liver dysfunction
J Trauma, 58(5); 2005
Case report on a successful bilateral dural enlargement with Tutopatch for brain decompression.

RINCON I ET AL.
Reconstructive possibilities in surgery of the frontal skull base and cavity. A case report.
Rev Esp Cir Oral y Maxilofac, 30(1); 2008
Case report on the reconstruction of the frontal skull base after tumor resection. Tutopatch was used to reconstruct the dural defect.

ROSER F AND TATAGI BA MS
Posttraumatic Syringomyelia
In: Neurosurgical forum, letters to the editor; J. Neurosurg Spine, 6(2); 2007
A duraplasty with implantation of membrane material (e.g. Tutopatch) should be mandatory to avoid new arachnoid scarring within the 1st postoperative month and to allow restoration of an adequate cavity for cerebrospinal fluid flow.
**Ophthalmology**

ALIO, JL, ET AL.  
**Bovine pericardium membrane (tutopatch) combined with solid platelet-rich plasma for the management of perforated corneal ulcers.**  
Cornea, 32(5); 2013  
A total of 6 patients were treated with Tutopatch and eye platelet-rich plasma (E-PRP) placed on the corneal surface, underneath the patch. In all cases, the corneal perforation was sealed. No evidence of infection or inflammation was detected. Digital tonometry confirmed acceptable ocular pressure in all cases. No patients reported pain, discomfort, or any subjective symptoms, and no complications were observed.

GUPTA M ET AL.  
**Bovine pericardium (Tutopatch) wrap for hydroxyapatite implants**  
Eye, 21(4); 2007  
Prospective study with 19 patients undergoing enucleation for uveal melanoma. The hydroxyapatite implants were wrapped with Tutopatch. Follow-up was 26 months (range 22-30 months). The authors conclude that Tutopatch is a safe wrapping material.

KROLL, J ET AL.  
**Defect covering of a perforated corneal ulcer with bovine pericardium transplant**  
Der Ophthalmologe, 111(1); 2014  
An operative treatment of an 89-year-old patient presented in an emergency situation with a perforated corneal ulcer of neurotrophic genesis was performed. Tutopatch® represents a good alternative for covering perforated corneal ulcers. (Article in German)

ORTUÑO-PRADOS VJ ET AL.  
**Treatment of a neurotrophic corneal ulcer with solid platelet-rich plasma and Tutopatch®**  
Arch Soc Esp Oftalmol, 86(4); 2011  
Case report of a patient with neurotrophic queratitis in the left eye treated with a Tutopatch® cover and platelet-rich plasma (PRP). The authors found this form of treatment very effective for progressive ulcers. Tutopatch® may constitute an alternative to amniotic membrane transplantation.

RINNA C ET AL.  
**Orbital floor restoration**  
J Craniofac Surg, 16(6); 2005  
Retrospective study with 379 patients treated over a period of 9 years. Smaller fractures (<1cm diameter) were treated with a collagen membrane alone, larger fractures received various rigid materials covered with a collagen membrane. A total of 268 patients received a Tutopatch. No infection occurred and all cases of enophthalmus were corrected.

SCHMAEL F ET AL.  
**Preseptal transconjunctival approach for orbital floor fracture repair: ophthalmologic results in 209 patients**  
Acta Oto-Laryngologica, 126(4); 2006  
Retrospective study on the results of 209 orbital floor reconstructions via a special approach. Defects were covered with Tutopatch.

SCUPOLA A ET AL.  
**Bovine Pericardium for Scleral Closure in Transscleral Local Resection of Choroidal Melanoma**  
Retina, 28(10); 2008  
Results of successful using bovine pericardium patches are presented in order to strengthen globe stability, repairing possible iatrogenic defects in the sclera flap, and to assist immediate vitrectomy, thus avoiding fluid leakage at the margins of the sutured scleral flap.
YALNIZ-AKKAYA Z ET AL.
Late-Onset Glaucoma-Filtrating Bleb Leak in a Penetrating Keratoplasty Patient: A Case Report
Case Reports in Ophthalmological Medicine in: Hindawi; 2012
Surgical bleb revision using Tutopatch and conjunctival advancement in a 48-year-old female patient was performed. The authors conclude that this method seems to be effective for treating late bleb leaks. However, careful follow-up is required for detecting recurrent leaks and elevated intraocular pressure.
http://www.hindawi.com/journals/criopm/2012/810751/

YALVAC IS ET AL.
Double-layer pericardium sandwich technique of Ahmed glaucoma valve implantation in patient with anterior necrotizing scleritis
Techniques in Ophthalmology, 3(2); 2005
Case report. Tutopatch was used to reinforce the thinned sclera and for coverage of a glaucoma shunt.

YOO C ET AL.
Pericardium Plug in the Repair of the Corneoscleral Fistula After Ahmed Glaucoma Valve Explantation
Korean Journal of Ophthalmology, (22); 2008
A Tutopatch plug was used to repair a corneoscleral fistula after Ahmed Glaucoma Valve explantation in 4 cases. No complication related to the fistula developed at the latest follow-up (range: 12-26 months).

Ear Nose Throat

DE DORLODOT, C ET AL.
Are bovine pericardium underlay xenograft and butterfly inlay autograft efficient for transcanal tympanoplasty?
Eur Arch Otorhinolaryngol, Dec; 2013
The authors recommend the butterfly technique for non-marginal perforation of the tympanic membrane after excision of the perforation edge and Tutopatch for bigger perforation or when standard autografts are not available

BAUMANN I ET AL.
Ossifying fibroma of the ethmoid involving the orbit and the skull base
Otoloaryngology-Head and Neck Surgery, 133; 2005
Case report. The skull base was reconstructed with Tutopatch.

CAVAZZA S ET AL.
Two anomalous localizations of mucocele: clinical presentation and retrospective review
Acta Otorhinolaryngologica Italica, 27; 2007
Two case reports. In one a defect in the posterior wall of the frontal sinus was closed with Tutopatch.

GERARD JM AND GERSDORFF M
The Tutopatch graft for transcanal myringoplasty
B-ENT, 2(4); 2006
In 11 patients a transcanal myringoplasty was performed. Follow-up was 3-14 months. In 10 patients the ear drum could be successfully closed. Except one all patients had an air-bone gap of less than 10 dB at 0.5, 1, 2 and 4 kHz. The authors conclude that with Tutopatch the same results can be obtained as with autologous temporalis fascia, perichondrium or cartilage-perichondrium.

INCESULU A ET AL.
The use of autograft and xenograft material in tympanoplasty: short term results
KBB-Forum, 1(1); 2002
Results of 31 patients with autologous temporalis fascia and 29 with Tutopatch for tympanoplasty were compared. Graft survival rate was 78% in the autograft group and 73% in the Tutoplast group.
http://kbb-forum.net/journal/summary_en.php3?id=7
MICHEL O
Transnasal surgery of the orbita (Transnasale Chirurgie der Orbita)
HNO, 48; 2000
Overview. For reconstruction of the medial orbital wall the author recommends Tutopatch, Tutoplast Fascia lata or Tutoplast Fascia temporalis. He advises against a polydioxanon foil because of difficult handling due to its rigidity and very slow epithelisation. (Article in German)

RINNA C ET AL.
Orbital floor restoration
J Craniofac Surg, 16(6); 2005
Retrospective study on 379 patients. 268 had Tutopatch. The authors discuss the pros and cons of synthetic materials.

SCHMAEL F ET AL.
Preseptal transconjunctival approach for orbital floor fracture repair: ophthalmologic results in 209 patients
Acta Oto-Laryngologica, 126; 2006
Retrospective study. 48 patients received Tutopatch to cover the defect. No complications attributable to the graft were recorded. 1 PDS patch dislocated.

SCHNEIDER G
Bioimplants-characteristics and use (Bioimplantate-Eigenschaften und Anwendungshinweise)
Laryngo Rhino Otol, 83; 2003
CME article describing various biological grafts in ENT. Tutopatch is recommended for duraplasty, tympanoplasty and septoplasty. (Article in German, English translation available)

Cardiothoracic

US MH ET AL.
A retrospective comparison of bovine pericardium and polytetrapolyethylene patch for closure of ventricular septal defects
J Int Med Res, 32; 2004
The outcome of 22 patients treated with Tutopatch and 57 treated with PTFE were compared. The outcome in the Tutopatch group was uneventful in all patients while in the PTFE group a patch dehiscence occurred in 4 patients. The authors prefer Tutopatch because of its handling characteristics, elasticity and the lower risk of endocarditis.

US MH ET AL.
Surgical correction in a patient with homozygous familial hypercholesterolemia
Turkish J Thorac Cardiovasc Surg, 13(4); 2005
Case report. The stenotic aortic root was enlarged with Tutopatch.

BASLAIM G AND BASION A
Repair of complete atrioventricular septal defects. Results with maintenance of the coronary sinus on the right atrial side
J Card Surg, 21; 2006
Retrospective study on 51 patients. Autologous pericardium was used for 25 ventricular septal defects and 40 atrial septal defects. Bovine pericardium (Tutopatch or Supple Peri-Guard) was used in 13 ventricular and 10 atrial septal defects.
Abdominal

SIMON S ET AL.
Experience with prosthetic implants in congenital abdominal wall defects
Abstract. German Association of Surgeons, annual Meeting, 2001
Overview over 65 patients treated between 1984 and 2000. Until 1998 Tutoplast Dura was used and Tutopatch thereafter. The authors look at Tutopatch as an appropriate material because of the absence of immunological rejections and total graft transformation into connective tissue.

SAXENA AK ET AL.
Delayed three-stage closure of giant omphalocele using pericard patch
Hernia, 12; 2008
Case report of a giant omphalocele that required a three-stage delayed closure and was managed using Tutopatch. Delayed staged closure has the advantage of avoiding multiple surgical procedures in the neonatal period and reduces morbidity in the management of giant omphalocles.

VAN TUIL C ET AL.
Experience with management of anterior abdominal wall defects using bovine pericard
Hernia, 10; 2006
Report on 24 patients with congenital abdominal wall defects treated with Tutopatch over a period of 5 years. The authors conclude that Tutopatch is an optimal biomaterial for the closure of anterior abdominal wall defects in gastrochisis and omphalocele.

YAVUZ N ET AL.
Laparoscopic repair of Morgagni hernia
Surg Laparosc Endosc Percutan Tech, 16(3); 2006
Report on the successful treatment of a Morgagnia hernia in 5 patients. In one patient Tutopatch was used.

Breast Reconstruction

SEMPRINI G ET AL.
The bovine pericardial patch in breast reconstruction: a case report.
Il Giornale di chirurgia, 33(11/12); 2012
Tutopatch® has been used in immediate breast reconstruction after mastectomy to close laterally the subpectoral pocket, allowing bigger volume prosthesis to be placed. There were no particular postoperative complications, and after 12 months of follow up the authors have found a valid functional and aesthetic result. The authors consider Tutopatch® as a valid alternative to other acellular dermal matrices specifically designed for breast reconstruction.
http://www.giornalechirurgia.it/common/php/portiere.php?ID=88f319b1cb6b1580fa19f1573d707fe7
Animal studies

ASLAN M ET AL.
Guided bone regeneration (GBR) on healing bone defects: A histological study in rabbits
J Contemp Dent Practice, 5(2); 2004
Two 3mm bone defects were drilled in the right tibia of 30 rabbits. One was covered with Tutopatch and the other left empty as control. 10 rabbits each were sacrificed on day 10, 20 and 30 and the defects examined histologically. In all Tutopatch covered defects new bone formation was found while in 4 control cases fibrous tissue only was seen. No resorption or dehiscence of Tutopatch occurred.

AYYILDIZ A ET AL.
A comparison of free skin graft, fascia lata, allograft, bovine pericardium and primary repair in urethrococutaneous fistulas without diversion: an experimental study
Pediatr Surg Int, 22; 2006
Comparison of several collagen membranes, among them Tutopatch (not specifically named but confirmed by the corresponding author via e-mail). Various parameters were rated with points. Tutopatch reached the highest number.

ÇÖLOĞLU H ET AL.
Comparison of autogenous cartilage, acellular dermis, and solvent-dehydrated pericardium for the prevention and correction of dorsal nasal irregularities: an experimental study
Aesth Plast Surg, 36; 2012
30 New Zealand rabbits underwent rhinoplasty with different materials among them with Tutopatch. The major advantages of Tutopatch were the ease of obtaining it without any donor site morbidity, shorter operative procedures, and lower distortion rates due to lack of cartilage memory. There were no adverse effects such as ulceration or extrusion and no adhesion to the overlying skin. In contrast, the used autogenous ear cartilage caused more cartilage resorption than expected by the authors. The authors conclude that Tutopatch may be used successfully as an “onlay” graft for dorsal nasal problems compared to autogenous cartilage, which is commonly used for this purpose.

DULAURENT T ET AL.
Use of bovine pericardium (Tutopatch®) graft for surgical repair of deep melting corneal ulcers in dogs and corneal sequestra in cats
Veterinary Ophthalmology, 17(2); 2014
The efficacy of Tutopatch in the treatment of deep melting corneal ulcers was evaluated in three dogs and corneal sequestra in three cats. Beginning corneal neovascularization was observed in all cases 1 week postoperatively. After 4 weeks, in two dogs and in all cats, the vascularization was regressing and the graft was integrated into the cornea, which was regaining transparency. Two months after the surgery, 5 of 6 corneas in two dogs and three cats had healed with focal corneal scarring. The authors conclude that Tutopatch offers a promising option for surgical reconstruction of the cornea following keratectomy for the management of corneal ulcers and sequestra.

KAPAN S ET AL.
Comparison of PTFE, pericardium bovine and fascia lata for repair of incisional hernia in rat model, experimental study
Hernia, 7(1); 2003
A 1x2cm subcutaneous full thickness abdominal wall defect was created in rats and closed with patches of Tutopatch, Tutoplast Fascia lata and Goretex Dual Mesh. After one and two weeks bursting pressure, tensile strength of the graft-tissue connection, histological graft maturation and adhesion formation were evaluated. All values were comparable for Tutopatch and GoreTex while bursting strength was lower with Fascia lata.
KOHL T ET AL.
Percutaneous fetoscopic patch coverage of experimental lumbosacral full-thickness skin lesions in sheep – a minimally invasive technique to minimize maternal trauma from fetal surgery for myelomeningocele
Surg Endoscopy, 17(8); 2003
In 7 sheep fetuses a full thickness defect in the lumbosacral region was created endoscopically to mimic a fetal myelomeningocele. In 6 the defect was closed with e-PTFE and in one with Tutopatch. After delivery 45 to 55 days later an autopsy was performed. The e-PTFE patches were still present and could be easily removed while the Tutopatch was completely remodelled.

ROTHAMEL D ET AL.
Biodegradation of differently crosslinked collagen membranes: an experimental study in the rat
Clin Oral Implants Res., 16; 2005
Various collagen membranes, among them Tutopatch, were implanted into dorsal muscle pouches in rats and examined histologically and histomorphometrically after 2, 4, 8, 16 and 24 weeks. Tutopatch was completely vascularised after 4 weeks and nearly completely remodelled after 16 weeks.

SCHWARZ F ET AL.
Angiogenesis pattern of native and cross-linked collagen membranes: an immunohistochemical study in the rat
Clin Oral Implants Res., 17(4); 2006
Various commercially available collagen membranes, among them the Tutodent membrane, and 3 experimental collagen membranes were tested. 4 each, randomly selected, were implanted into muscle pouches in the back of rats and examined after 2, 4, 8, 16 and 24 weeks. The Tutodent membrane showed a homogenous transmembraneous formation of blood vessels 4-8 weeks after implantation.

SUNGUR N ET AL.
Prevention of tendon adhesions by the reconstruction of the tendon sheet with solvent dehydrated bovine pericard. An experimental study.
J Trauma, 61(6); 2006
Chicken were chosen as a model because of the anatomical and functional similarity to the human flexor tendon apparatus. In 30 chicken the tendon sheet between the proximal and distal ring band was resected. In 10 animals the defect remained untreated, in 10 it was covered with autologous fascia and in 10 with Tutopatch. Animals were sacrificed after 5 and 12 weeks. The gliding function in the Tutopatch group was significantly better than in the two other groups.

QIU QQ ET AL.
In Vitro and In Vivo Comparison of Tutopatch® Bovine Pericardium and Veritas® Collagen Matrix for Hernia Repair
White Paper, RTI Surgical, Inc., Alachua; FL, USA; 2014
Nine dogs received Tutopatch® on one side and Veritas on the contralateral side sutured over the abdominal wall. Tutopatch® showed more favourable characteristics at all investigation times (4, 8 and 12 weeks) postop. As Example Tutopatch® did not contract and remained tension free in vivo and exhibited significantly greater cell infiltration and neovascularization than Veritas throughout the 12-week implantation period.
Laboratory studies

ROTHAMEL D ET AL.
Biocompatibility of various collagen membranes in cultures of human PDL fibroblasts and human osteoblast-like cells
Clin Oral Implants Res, 15(4); 2004
Various collagen membranes, among them Tutopatch, were tested in cell cultures for cell proliferation. While cell count was highest in controls, cell shape was the same on Tutopatch than in controls. It was concluded that Tutopatch promotes cell attachment and proliferation.

MODER D ET AL.
Collagenase digestion of collagen membranes in vitro
Abstract of a presentation, IADR-Continental European and Israeli Divisions, annual Meeting, 2007
Degradation kinetics of BioGuide, BioMend, Ossix, Tutodent and an experimental membrane after incubation in collagenase were analyzed. BioGuide was completely digested after 2h and BioMend and Ossix after 6h. After 12h 40% of Tutodent remained.
http://iadr.confex.com/iadr/israel07/techprogram/abstract_95362.htm