Summary of Safety and Clinical Performance

Lyoplant®_Lyoplant® Onlay

SSCP identifier:	BDoCS-AIM-067295
Manufacturer contact details	
Legal manufacturer name:	Aesculap AG
Address:	Am Aesculap-Platz 78532 Tuttlingen Germany
SRN:	DE-MF-000005504
Person responsible for regulatory compliance:	Jacqueline Liebers
E-mail:	jacqueline.liebers@aesculap.de
Phone:	+49 7461 95-31815
Fax:	--

Part 1: Intended for healthcare professionals

This Summary of Safety and Clinical Performance (SSCP) is intended to provide public access to an updated summary of the main aspects of the safety and clinical performance of the device.
The SSCP is not intended to replace the Instructions for Use as the main document to ensure the safe use of the device, nor is it intended to provide diagnostic or therapeutic suggestions to intended users or patients.
The following information is intended for users/healthcare professionals.

List of abbreviation / glossary

Basic UDI-DI	Basic Unique device identification device identifier
CSF	Cerebrospinal fluid
FSCA	Field safety corrective action
FSN	Field safety notice
MRI	Magnetic Resonance Imaging
PMCF	Post-market clinical follow-up
PSMC	Pseudomeningocele
SOTA	State-of-the-art
SSCP	Summary of Safety and Clinical Performance
SSI	Surgical Site Infection

1 Device identification and general information

1.1 Device trade name

	Article Number	Device Name	Content
Lyoplant®	1066021	Lyoplant 6 x 14 cm	1 piece
	1066030	Lyoplant 8 x 9 cm	1 piece
	1066242	Lyoplant 6 x 8 cm	1 piece
	1066050	Lyoplant 5 x 6 cm	1 piece
	1066048	Lyoplant 4 x 10 cm	1 piece
	1066064	Lyoplant 4 x 5 cm	2 pieces
	1066080	Lyoplant 2 x 10 cm	2 pieces
	1066102	Lyoplant 1.5 x 3 cm	2 pieces
Lyoplant® Onlay	1067010	Lyoplant Onlay 2.5 x 2.5 cm	1 piece
	1067020	Lyoplant Onlay 5 x 5 cm	1 piece
	1067030	Lyoplant Onlay 2.5 x 7.5 cm	1 piece
	1067040	Lyoplant Onlay 7.5 x 7.5 cm	1 piece
	1067050	Lyoplant Onlay 10 x 12.5 cm	1 piece

1.2 Manufacturer's name and address

Aesculap AG
Am Aesculap-Platz
78532 Tuttlingen/Germany

1.3 Manufacturer's single registration number (SRN)

Manufacturer's single registration number: DE-MF-000005504

1.4 Basic UDI-DI

Basic UDI-DI for Lyoplant® and Lyoplant® Onlay: 403923900000150529

1.5 Medical device nomenclature description

P900402 "Biodegradable devices, filler and reconstructive"

1.6 Class of device

Class III, Rules 8.2, 8.3, and 18.

1.7 Year when the first certificate (CE) was issued covering the device

Lyoplant® and Lyoplant® Onlay were CE certified as medical devices in 1997 and 2013, respectively.

1.8 Authorized representative if applicable; name and the SRN

Not applicable.

1.9 NB's name (the NB that will validate the SSCP) and the NB's single identification number

TÜV SÜD Product Service GmbH
Ridlerstraße 65

Effective

80339 München

Single identification number: 0123

2 The intended purpose of the device, indications, contraindications and target populations

2.1 Intended purpose

Lyoplant® is an implant of purified collagen obtained from bovine pericardium. It is intended to be used as a dura mater substitute in neurosurgery.

Lyoplant® Onlay is an implant of purified collagen obtained from bovine pericardium and bovine split hide. It is intended to be used as a dura mater substitute in neurosurgery.

2.2 Indication(s) and target population(s)

Indications

Replacement and extension of connective tissue structure in neurosurgery:

- For covering cerebral and cerebellar dural defects
- For cerebral decompression surgery
- For covering spinal dural defects
- For spinal decompression surgery

Intended Users

Surgeons with required knowledge about the surgical technique and surgical training who are aware about the in vivo characteristics of the product, operating room personnel (set-up, handling, functional check).

Intended patient population

There are no general gender, age or ethnic limitations on patient population for the use of the product when used within its intended use. Restrictions are defined by the contraindications.

2.3 Contraindications and/or limitations

Lyoplant® and Lyoplant® Onlay should not be applied:

- In infected regions
- To replace connective tissue structures that are subject to mechanical stress
- In case of known hypersensitivity against proteins of bovine origin
- in any application area that is not mentioned in "Indications"

3 Device description

3.1 Description of the device

Lyoplant® is a sterile, resorbable collagen implant composed of purified collagen type I/III derived from bovine pericardium and designed for suturable application. The implant thickness reflects the natural variability of the native pericardium, with an average value of 0.7 ± 0.2 mm.

Lyoplant® Onlay is a sterile, resorbable, bilayer collagen implant composed of purified collagen type I/III. The implant features a dual-layer structure derived from bovine pericardium and bovine split hide, enabling both onlay and suturable application techniques. The two layers are physically bonded through a lyophilization (freeze-drying) process. The implant exhibits an average thickness of 3.2 ± 0.5 mm.

Lyoplant® and Lyoplant® Onlay are cleansed of non-collagenous components such as enzymes, lipids, and non-collagenous proteins through a specialized preparation process. They are not chemically cross-linked.

Mode of Action

After implantation, the colonization of the implants by connective tissue cells begins after only a few days. The collagen will be converted into human connective tissue. The complete revitalization takes place within a period of one to three months.

3.2 A reference to previous generation(s) or variants if such exist, and a description of the differences

Since the market launch of Lyoplant® and Lyoplant® Onlay, no changes to the devices have been made. No variants of Lyoplant® and Lyoplant® Onlay other than the different product and packaging sizes, are available.

3.3 Description of any accessories which are intended to be used in combination with the device

Lyoplant® must be fixed using non-absorbable suture material (polyester, polypropylene).

Lyoplant® Onlay, in case of sutured application, must be fixed using the same suture material. The use of atraumatic round body needles permits suturing without compromising the integrity of the implant.

In addition, sealing with fibrin sealants can be performed for both Lyoplant® and Lyoplant® Onlay.

3.4 Description of any other devices and products which are intended to be used in combination with the device

There are no other devices nor products which are intended to be used in combination with the device.

4 Risks and warnings

4.1 Residual risks and undesirable effects

The following complications/side effects are possible with the use of the devices under evaluation:

- Cerebrospinal fluid (CSF) leak
- Surgical site infection (SSI)
- Adhesion
- Allergic reactions to proteins of bovine origin

Table 2. Quantitative data on complications/side effects.

Side effect	Complaint rate*	Clinical occurrence rate**	Probability of occurrence***
SSI	≤ 0.001%	~1–2%	Occasional < 0.5 -5%
CSF leak	≤ 0.004%	~3-4%	Occasional < 0.5 -5%

Adhesion	0%	0%	Improbable < 0.05%
Allergic reactions to proteins of bovine origin	0%	0%	Improbable < 0.05%

* Complaint rate calculated as number of complaints divided by total units sold over the past 5 years.
** Derived from clinical studies and published literature. Complication rates for Lyoplant® and Lyoplant® Onlay are comparable, with no statistically significant differences.
*** Probability of occurrence derived from product risk catalog

4.2 Warnings and precautions

- Only remove products from their original protective packaging immediately before application.
- Visually inspect the product packaging to ensure that the sterile barrier system is intact.
- Do not use products from open or damaged sterile packaging.
- Do not use the product after its use-by date.
- The product is intended for single use.
- Do not reuse the product.
- Do not process the product
- MRI examinations using magnetic fields of 1.5 or 3.0 Tesla do not present an additional risk to implant bearers as the product is made of non-metallic material.

4.3 Other relevant aspects of safety, including a summary of any field safety corrective action (FSCA including FSN) if applicable

No FSN nor FSCA were necessary for the products in the last five years.

5 Summary of clinical evaluation and post-market clinical follow-up (PMCF)

5.1 Summary of clinical data related to equivalent device, if applicable

Not applicable.

5.2 Summary of clinical data from conducted investigations of the device before the CE-marking, if applicable

Clinical study by Grundmann

The aim of the prospective, multi-center study conducted between 1994-1996, was to evaluate the safety and performance of Lyoplant® in neurosurgical head surgery in terms of intraoperative handling, immediate postoperative complications and long-term compatibility of the product.

In the study, Lyoplant® (n=60) was compared to Lyodura® (n=58). Both devices showed comparable complication rates. Intraoperatively, Lyoplant® was associated with cerebral swelling and dura laceration, while Lyodura® was linked to one haemorrhage. During hospitalization, 14 postoperative complications were recorded, including three cases of CSF fistula (2.5%) (n=2 Lyoplant®), one pseudomeningocele (1.6%), PSMC (Lyoplant® group), infections (1.6% per group), hematomas (5% in the Lyoplant® group, 1.7% in the Lyodura® group), cerebral swelling and bronchitis (Lyodura® group). CSF leaks events were non-serious, resolved without surgery, and left no sequelae.

Lyoplant® demonstrated consistent CSF tightness and suture tear resistance, whereas Lyodura® had two cases of suture tear-out. Surgeons rated Lyoplant® highly in terms of usability: 100% for cutting and adaptability, 91.7% for thickness, 98.3% for stiffness, and 95% for suturing.

5.3 Summary of clinical data from other sources, if applicable

PMCF studies

PMCF Study - Lyoplace (Lyoplant®)

A retrospective, single-center study (2024) evaluated the safety and performance of Lyoplant® in 50 patients, including six pediatric cases. The observation period spanned December 2020 to November 2022, with an average follow-up of six months.

- CSF-related complications occurred in 10 patients, of which nine cases (18%) were clinically relevant.
- Open CSF leaks occurred in four patients (8%), three of which required surgical revision.
- Closed CSF leaks were observed in six patients (12%), likely postoperative subcutaneous fluid collections (PSMC).
- Among pediatric patients, one child developed a closed CSF leak; no foreign body reactions were observed.
- Other complications, including hydrocephalus and ventriculitis
- None of the complications were considered related to Lyoplant®.

These findings support the safety and clinical usability of Lyoplant® in adult and pediatric neurosurgery, across supratentorial and infratentorial regions, in both elective and emergency procedures.

PMCF Study - Lyon (Lyoplant® Onlay)

A prospective, observational, single-arm cohort study (2016–2018) included 61 patients across three sites, covering cranial and spinal procedures of varying dura defect sizes. Surgeons with differing experience levels applied Lyoplant® Onlay.

- Primary endpoint: No reoperations due to CSF leak at discharge (0.0%).
- SSI: Two patients (3.3%), with no causal relationship to the implant.
- Handling characteristics (cutting, tensile strength, tissue adaptation, onlay effect, suture retention) were consistently rated positively.
- Wounds were dry and sealed at discharge and follow-up. Subcutaneous swelling and fluid collections were rare and clinically insignificant.
- Routine imaging occasionally revealed fluid accumulation and edema, considered normal postoperative findings.

Lyoplant® Onlay demonstrated safety, effectiveness, and favorable handling across diverse neurosurgical applications.

Comparative study Lyoplant® Onlay and Duraform in China

A prospective, multicenter, randomized controlled study (2018–2020) compared Lyoplant® Onlay (n=129) to Duraform (n=127).

- CSF leak rate at 90 days post-op: 1.9% (Lyoplant® Onlay) vs. 3.0% (Duraform), no statistically significant difference.

Effective

- SSI rates: Low and comparable: Lyoplant® Onlay — 0.9% (2 days), 2.8% (pre-discharge), 0.0% (3 months); Duraform — 0.0%, 1.0%, 0.0%; no significant difference.

Lyoplant® Onlay demonstrated a strong safety profile, reliable performance, and was well-received by users, showing equivalence to Duraform in efficacy and safety.

Expert Reports

Multiple independent expert reports document extensive clinical experience with Lyoplant® and Lyoplant® Onlay across a broad range of neurosurgical indications, patient populations, and clinical settings. Collectively, these reports encompass over 125 neurosurgical cases performed between 1994 and 2023, including adult and pediatric patients, with ages ranging from neonates to elderly adults.

Across all centers, Lyoplant® and Lyoplant® Onlay demonstrated reliable dural sealing performance, excellent handling characteristics, and a favorable safety profile. The implants were used in diverse indications such as tumor resections (including posterior fossa and intraventricular lesions), trauma, congenital malformations, spina bifida, decompressive craniectomies, and incidental dural tears, particularly in situations where primary dural closure was not feasible.

Handling and usability were consistently highlighted as key advantages. Surgeons reported good flexibility, ease of trimming and shaping, adaptability to varying defect sizes, and effective contouring to the dura. Rehydration in saline further improved pliability. Lyoplant® Onlay was noted to provide rapid and effective watertight closure, often with minimal or selective fixation, and to perform well even in areas with poor tissue quality where suturing was limited or impossible.

From a safety perspective, the collective experience showed:

- no cases of refractory CSF leakage
- no SSIs requiring revision
- no foreign-body reactions
- no device-related serious adverse events

Clinical experience in pediatric neurosurgery, including neonates, confirms that Lyoplant® Onlay is well tolerated and suitable for complex pediatric application. Earlier long-term data further support the implant's biocompatibility and durability, with no early or late complications observed during follow-up.

User surveys

User survey data collected between 2019 and 2023 provide consistent real-world evidence supporting the safety, performance, and usability of Lyoplant® and Lyoplant® Onlay in neurosurgical applications across adult and pediatric populations.

The 2019 Lyoplant® user survey included experienced neurosurgeons from multiple countries and demonstrated high overall user satisfaction. Lyoplant® was rated very good to excellent for key performance characteristics, including cutting ability, suturability, anatomical adaptability, tensile strength, suture retention, and liquid tightness. No negative findings related to sealing performance were reported, confirming reliable dural closure in routine clinical practice.

The 2023 prospective PMCF user survey focused on pediatric neurosurgery and evaluated both Lyoplant® and Lyoplant® Onlay. The implants were primarily used in tumor resections, spina bifida, and Chiari decompression

Effective

in patients aged 3 to 18 years. Reported complication rates, including CSF leakage and SSI, were within the expected range for pediatric neurosurgical procedures and comparable to adult outcomes. Most users reported low adhesion rates, and overall clinical outcomes were predominantly rated as very good.

In summary, the user survey results consistently demonstrate that Lyoplant® and Lyoplant® Onlay offer reliable performance, good handling characteristics, and a favorable safety profile. The data support a positive benefit–risk balance, particularly in cases where autologous dural closure is not feasible.

Literature on the product

A total 22 publications have been identified reporting the use Lyoplant® and Lyoplant® Onlay across various neurosurgical indications. (1–22) The most reported complications were CSF leak and SSI. Overall occurrence rates reported in the literature fall within the acceptance criteria defined by the state-of-the-art (SOTA) review and are considered acceptable. Importantly, none of the reviewed publications established a causal relationship between these complications and the use of Lyoplant® or Lyoplant® Onlay. Reported complications are generally procedure-related, rather than device-related.

For example, a retrospective cohort study of 110 pediatric patients undergoing Chiari I decompression (with or without duraplasty) reported the highest SSI rate observed in the product literature (4.3%). (8) Of these patients, 63 (57%) underwent dural splitting decompression, and 47 (43%) received dural expansion using Lyoplant®. SSI rates were comparable between groups (3.2% vs. 4.3%), indicating that the infections were associated with factors such as procedural complexity, or surgical technique, rather than the implant itself.

The identified clinical data from the literature on Lyoplant® and Lyoplant® Onlay indicates a safe and clinically effective performance within the intended purpose.

Altogether, the collected data are sufficient to prove the clinical safety and performance of the Lyoplant® and Lyoplant® Onlay and to confirm the intended use within the target patient population.

5.4 An overall summary of the clinical performance and safety

Safety and performance indicators which require support from relevant clinical data were defined and described in the clinical evaluation. The indicators depend on factors that can be either controlled by the manufacturer (e.g., material and manufacturing) or on situation-specific factors (e.g., surgical application, patient-specific factors), as well as on the surgical use and handling.

To assess the devices' safety and performance, the following sources were systematically analyzed: SOTA literature, PMCF studies, product-specific literature, market feedback and regulatory authority databases, product testing including sterility, usability, and biocompatibility assessment.

The analysis found no safety-or-performance related risks that deviate from SOTA. All device-related outcome parameters met the predefined acceptance criteria (Table 3), and no previously unknown risk or adverse events were identified.

Table 3. Safety and performance parameters with specified acceptance criteria.

	Clinical occurrence rate*		SOTA acceptance criteria
Safety Parameter	**Lyoplant®**	**Lyoplant® Onlay**	
SSI	1.2 ± 0.6%	1.6 ± 0.8%	≤ 1.6 ± 1.2%
Meningitis	0.0 ± 0.0%	0.5 ± 0.5%	≤ 4.5 ± 3.9%
Performance Parameter			

CSF leak	3.7 ± 2.6%	3.4 ± 1.5%	≤ 5.1 ± 3.7%
PSMC	4.3 ± 4.2%	0.0 ± 0.0%	≤ 5.9 ± 3.7%

* Derived from clinical studies and product-specific literature.

5.4.1 Clinical benefits for the patient

Lyoplant® and Lyoplant® Onlay are designed to provide an immediate, impermeable barrier to CSF, effectively preventing CSF leaks. Evidence from clinical investigations before the CE-marking, PMCF studies and product literature confirms the devices satisfactory performance in CSF leak prevention (see Tables 2 and 3). No systematic performance issues or safety concerns have been reported, supporting a high success rate consistent with its intended use.

As a biodegradable implants, Lyoplant® and Lyoplant® Onlay are intended to support dural closure while undergoing gradual remodeling and replacement by host tissue. The in-vivo studies showed that both devices provide effective structural support and biological function throughout the full course of healing. Early tissue integration and fibroblast infiltration was evident by 2 weeks, progressing to firm fibrous integration with the native dura by 6-10 weeks. By three months, the repair sites were indistinguishable from native dura with no detectable material remnants and no adverse events

Overall, the data provide strong evidence of Lyoplant® and Lyoplant® Onlay clinical benefit and confirm their safety and performance for the intended use, meeting clinical expectations.

5.4.2 Benefits-risk assessment

When employed according to the intended purpose of the device, the product does not pose an unacceptable hazard regarding the clinical situation, the safety of patients or users. The indication, contraindications and intended use as well as warnings and precautions of Lyoplant® and Lyoplant® Onlay are clearly defined. The information materials supplied by the manufacturer are considered adequate.

The clinical risks connected to the device were demonstrated and evaluated in a clear way, the risk reduction measures are adequate, and the performance and safety can be proven by the presented data.
The available data for this clinical evaluation is deemed sufficient for a critical evaluation. Further measures to acquire post-market data concerning the safety and performance of the device, which will continuously and pro-actively provide data, are laid out in the PMCF-Plan, and are described in Section 5.5. *Ongoing or planned PMCF* of this SSCP.

According to the presented data, the clinical benefit overweighs the risks of the application of Lyoplant® and Lyoplant® Onlay The benefit-risk profile of Lyoplant® and Lyoplant® Onlay is acceptable.

5.5 Ongoing or planned PMCF

No.	PMCF measure	Aim of measure	Timeline
1	Market feedback / Complaints	Analyze reported production and device failures as well as difficulties in product handling.	Ongoing, yearly
2	FSN/FSCA/CAPA measures	Analyze reported production and device failures as well as difficulties in product handling, during routine clinical use.	Ongoing, yearly
3	Review of regulatory databases	Analyze reported failures concerning the device and equivalent or similar competitor devices	Ongoing, yearly

5	Clinical data from literature	Safety and performance, monitoring of potential negative information	Ongoing, yearly

6 Possible diagnostic or therapeutic alternatives

To ensure a safe closure of the dura mater, the user can choose from various methods and materials. Primary closure of the dura mater as preferred treatment method is still valid. If this is not possible, dura mater defects can be treated satisfactorily with the help of replacement materials. The use of autologous tissues (e. g. fascia lata, temporal fascia) is primarily used here as they cause only minor foreign body reactions. The disadvantages of these are the limited availability regarding the treatment of larger dura defects and the additional incision for harvesting the graft, which represents an additional risk of infection. Materials of animal origin are characterized by a low foreign body reaction. Furthermore, they are absorbed by the body over time and support cell proliferation and tissue regeneration. However, there is a theoretical risk of transmission of zoonoses (e. g. bovine spongiform encephalopathy) when using these materials. The use of absorbable or non-absorbable synthetic materials for dura replacement can reduce these risks, but complications such as foreign body reaction and limited tissue integration may also occur. Nonetheless, synthetic materials offer consistent quality and handling attributes, tunable physicochemical properties, and are readily available.

7 Suggested profile and training for users

Surgeons with required knowledge about the surgical technique and surgical training who are aware of the in vivo characteristics of the product, operating room personnel (set-up, handling, and functional check). No additional training is required.

8 Reference to any harmonized standards and CS applied

Standard / Guidance / Regulation	Date	Title	Product specific	Harmonized under MDR	Applied in full (F) or in part (P)
DIN EN ISO 13485	2021	Medical devices - Quality management systems - Requirements for regulatory purposes (ISO 13485:2016)	N	N	F
DIN EN ISO 14971	2022	Medical devices - Application of risk management to medical devices (ISO 14971:2019)	N	N	F
DIN EN ISO 20417	2022	Medical devices - Information to be supplied by the manufacturer (ISO 20417:2021, Corrected version 2021-12)	N	N	F
DIN EN ISO 15223-1	2022	Medical devices - Symbols to be used with information to be supplied by the manufacturer - Part 1: General requirements (ISO 15223-1:2021)	N	N	P
DIN EN 62366-1	2021	Medical devices - Part 1: Application of usability engineering to medical devices (IEC 62366-1:2015 + COR1:2016 + A1:2020)	N	N	F
DIN EN ISO 14155	2021	Clinical investigation of medical devices for human subjects - Good clinical practice (ISO 14155:2020)	N	N	F

Effective

DIN EN ISO 14155/A11	2025	Clinical investigation of medical devices for human subjects - Good clinical practice (ISO 14155:2020)	N	N	F
DIN EN ISO 11135	2020	Sterilization of health-care products - Ethylene oxide - Requirements for the development, validation and routine control of a sterilization process for medical devices (ISO 11135:2014 + Amd.1:2018)	N	N	F
DIN EN ISO 11737-1	2021	Sterilization of health care products - Microbiological methods - Part 1: Determination of a population of microorganisms on products (ISO 11737-1:2018 + Amd 1:2021)	N	N	F
DIN EN ISO 11737-2	2020	Sterilization of health care products - Microbiological methods - Part 2: Tests of sterility performed in the definition, validation and maintenance of a sterilization process (ISO 11737-2:2019)	N	N	F
DIN EN 556-1	2024	Sterilization of medical devices - Requirements for medical devices to be designated "STERILE" - Part 1: Requirements for terminally sterilized medical devices	N	Y	F
DIN EN ISO 11607-1	2024	Packaging for terminally sterilized medical devices - Part 1: Requirements for materials, sterile barrier systems and packaging systems (ISO 11607-1:2019 + Amd 1:2023)	N	N	F
DIN EN ISO 11607-2	2024	Packaging for terminally sterilized medical devices - Part 2: Validation requirements for forming, sealing and assembly processes (ISO 11607-2:2019 + Amd 1:2023)	N	N	F
DIN EN 868-5	2019	Packaging for terminally sterilized medical devices - Part 5: Sealable pouches and reels of porous materials and plastic film construction - Requirements and test methods	N	N	F
DIN EN ISO 22442-1	2021	Medical devices utilizing animal tissues and their derivatives - Part 1: Application of risk management (ISO 22442-1:2020)	Y	Y	F
DIN EN ISO 22442-2	2021	Medical devices utilizing animal tissues and their derivatives - Part 2: Controls on sourcing, collection and handling (ISO 22442-2:2020)	Y	Y	F
DIN EN ISO 22442-3	2008	Medical devices utilizing animal tissues and their derivatives - Part 3: Validation of the elimination and/or inactivation of viruses and transmissible spongiform encephalopathy (TSE) agents (ISO 22442-3:2007)	Y	Y	F
DIN EN ISO 14630	2025	Non-active surgical implants - General requirements (ISO 14630:2012)	Y	Y	F
DIN EN ISO 14644-1	2016	Cleanrooms and associated controlled environments - Part 1: Classification of air	N	N	F

		cleanliness by particle concentration (ISO 14644-1:2015)			
DIN EN ISO 10993-1	2021	Biological evaluation of medical devices - Part 1: Evaluation and testing within a risk management process (ISO 10993-1:2018, including corrected version 2018-10)	N	N	F
DIN EN ISO 10993-2	2023	Biological evaluation of medical devices - Part 2: Animal welfare requirements (ISO 10993-2:2022)	N	N	F
DIN EN ISO 10993-3	2015	Biological evaluation of medical devices - Part 3: Tests for genotoxicity, carcinogenicity and reproductive toxicity (ISO 10993-3:2014)	N	N	F
DIN EN ISO 10993-5/A11:2025	2025	Biological evaluation of medical devices - Part 5: Tests for in vitro cytotoxicity (ISO 10993-5:2009)	N	N	F
DIN EN ISO 10993-6	2017	Biological evaluation of medical devices - Part 6: Tests for local effects after implantation (ISO 10993-6:2016)	N	N	F
DIN EN ISO 10993-7	2022	Biological evaluation of medical devices - Part 7: Ethylene oxide sterilization residuals (ISO 10993-7:2008 + Cor 1:2009 + Amd 1:2019)	N	N	F
DIN EN ISO 10993-9	2022	Biological evaluation of medical devices - Part 9: Framework for identification and quantification of potential degradation products (ISO 10993-9:2019)	N	N	F
DIN EN ISO 10993-10	2023	Biological evaluation of medical devices - Part 10: Tests for skin sensitization (ISO 10993-10:2021)	N	N	F
DIN EN ISO 10993-11	2018	Biological evaluation of medical devices - Part 11: Tests for systemic toxicity (ISO 10993-11:2017)	N	N	F
DIN EN ISO 10993-12	2021	Biological evaluation of medical devices - Part 12: Sample preparation and reference materials (ISO 10993-12:2021)	N	N	F
DIN EN ISO 10993-16	2018	Biological evaluation of medical devices - Part 16: Toxicokinetic study design for degradation products and leachables (ISO 10993-16:2017)	N	N	F
DIN EN ISO 10993-17	2024	Biological evaluation of medical devices Part 17: Toxicological risk assessment of medical device constituents (ISO 10993-17:2023)	N	N	F
DIN EN ISO 10993-18	2023	Biological evaluation of medical devices - Part 18: Chemical characterization of medical device materials within a risk management process (ISO 10993-18:2020 + Amd 1:2022)	N	N	F

ISO/TS 10993-20	2006	Biological evaluation of medical devices - Part 20: Principles and methods for immunotoxicology testing of medical devices	N	N	F
DIN EN ISO 10993-23	2021	Biological evaluation of medical devices - Part 23: Tests for irritation (ISO 10993-23:2021)	N	N	F
ASTM F1980	2021	Standard Guide for Accelerated Aging of Sterile Barrier Systems and Medical Devices	N	N	F
ASTM D 4169 e1	2023	Standard Practice for Performance Testing of Shipping Containers and Systems	N	N	F
ASTM D3787-16	2020	Standard Test Method for Bursting Strength of Textiles—Constant-Rate-of-Traverse (CRT) Ball Burst Test	N	N	F
DIN EN ISO 12625-9	2015	Tissue paper and tissue products - Part 9: Determination of ball burst strength (ISO 12625-9:2015)	N	N	F
MDCG 2020-5	2020	Guidance on Clinical Evaluation - Equivalence	N	n/a	n/a
MDCG 2020-6	2020	Guidance on Sufficient Clinical Evidence for Legacy Devices	N	n/a	F
MDCG 2020-7	2020	Guidance on PMCF Plan Template.	N	n/a	F
MDCG 2020-8	2020	Guidance on PMCF Evaluation Report Template.	N	n/a	F
MDCG 2018-1	2021	Guidance on basic UDI-DI and changes to UDI-DI	N	n/a	F
MDCG 2019-8 v2	2020	Implant Card relating to the application of Article 18 Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices	N	n/a	F
MDCG 2021-11	2021	Guidance on Implant Card – Device types	N	n/a	F
MDCG 2021-24	2021	Guidance on classification of medical devices	N	n/a	F
MEDDEV 2.7/1/Rev.4	2016	Clinical evaluation: a guide for manufacturers and notified bodies under directives 93/42/eec and 90/385/eec	N	n/a	F
MDCG 2019-9 Rev.1	2022	Summary of safety and clinical performance	N	n/a	F
Commission Regulation (EU) No 722/2012	2012	Active implantable medical devices and medical devices manufactured utilising tissues of animal origin	N	n/a	F
Regulation (EC) No 1069/2009	2009	Laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation)	N	n/a	F
Commission Decision 2007/453/EC	2007	BSE status of Member States or third countries or regions thereof according to their BSE risk	N	n/a	F

Regulation (EC) No 999/2001	2001	Laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies	N	n/a	F

Part 2: Intended for patients

This Summary of Safety and Clinical Performance (SSCP) is intended to provide public access to an updated summary of the main aspects of the safety and clinical performance of the device. The information presented below is intended for patients or lay persons. A more extensive summary of its safety and clinical performance prepared for healthcare professionals is found in the first part of this document.
The SSCP is not intended to give general advice on the treatment of a medical condition. Please contact your healthcare professional in case you have questions about your medical condition or about the use of the device in your situation. This SSCP is not intended to replace an Implant card or the Instructions for Use to provide information on the safe use of the device.

List of abbreviation / glossary

Basic UDI-DI	Unique device identification device identifier
CSF	Cerebrospinal fluid
FSCA	Field safety corrective action
FSN	Field safety notice
MRI	Magnetic Resonance Imaging
SSCP	Summary of Safety and Clinical Performance
PMCF	Post-market clinical follow-up

1 Device identification and general information

1.1 Device trade name

	Reference Number	Device Name	Content
Lyoplant®	1066021	Lyoplant 6 x 14 cm	1 piece
	1066030	Lyoplant 8 x 9 cm	1 piece
	1066242	Lyoplant 6 x 8 cm	1 piece
	1066050	Lyoplant 5 x 6 cm	1 piece
	1066048	Lyoplant 4 x 10 cm	1 piece
	1066064	Lyoplant 4 x 5 cm	2 pieces
	1066080	Lyoplant 2 x 10 cm	2 pieces
	1066102	Lyoplant 1.5 x 3 cm	2 pieces
Lyoplant® Onlay	1067010	Lyoplant Onlay 2.5 x 2.5 cm	1 piece
	1067020	Lyoplant Onlay 5 x 5 cm	1 piece
	1067030	Lyoplant Onlay 2.5 x 7.5 cm	1 piece
	1067040	Lyoplant Onlay 7.5 x 7.5 cm	1 piece
	1067050	Lyoplant Onlay 10 x 12.5 cm	1 piece

1.2 Manufacturer; name and address

Aesculap AG
Am Aesculap-Platz
78532 Tuttlingen/Germany

1.3 Basic UDI-DI

Basic UDI-DI[1] for Lyoplant® and Lyoplant® Onlay: 403923900000150529

1.4 Year when the device was first CE-marked

Lyoplant® and Lyoplant® Onlay were CE certified[2] as medical devices in 1997 and 2013, respectively since.

2 The intended purpose of the device, indications, contraindications and target populations

2.1 Intended purpose

Lyoplant® is an implant of purified collagen obtained from bovine pericardium[3]. It is intended to be used as a dura mater[4] substitute in neurosurgery.

[1] **Basic UDI-DI**: an identification number that is specific for a group of products with similar intended use
[2] **CE marking**: a certification mark that indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). The CE marking is also found on products sold outside the EEA that are manufactured in, or designed to be sold in the EEA.
[3] **Bovine pericardium**: a thin, strong tissue taken from the sac around a cow's heart.
[4] **Dura mater**: a membrane forming the outermost of the three coverings of the brain and spinal cord external.

Lyoplant® Onlay is an implant of purified collagen obtained from bovine pericardium and bovine split hide[5]. It is intended to be used as a dura mater substitute in neurosurgery.

2.2 Indication(s) and target population(s)

Indications

- For covering cerebral and cerebellar[6] dural defects
- For cerebral decompression surgery
- For covering spinal dural defects
- For spinal decompression surgery

Intended patient population

There are no general gender, age or ethnic limitations on patient population for the use of the product when used within its intended use. Restrictions are defined by the contraindications

2.3 Contraindications

Lyoplant® and Lyoplant® Onlay should not be applied:

- In infected regions
- To replace connective tissue structures that are subject to mechanical stress
- In case of known hypersensitivity against proteins of bovine origin
- In any application area that is not mentioned in "Indications"

3 Device description

3.1 Device description and material/substances in contact with patient tissues

Lyoplant® is a sterile, resorbable[7] collagen implant made of highly purified collagen derived from cattle. Lyoplant® is designed to be stitched in place by surgeon.

Lyoplant® Onlay is also a sterile, resorbable, bilayer collagen implant made of highly purified collagen derived from cattle. It consists of two bonded layers, which allow the implant to be placed securely without stitches, depending on the surgical situation. This design supports stable placement when suturing is not required.

For both Lyoplant® and Lyoplant® Onlay, the collagen material is carefully processed and purified to remove unwanted substances and to meet strict medical safety and quality standards.

Mode of Action

Lyoplant® and Lyoplant® Onlay are designed to temporarily replace or support the dura mater during neurosurgical procedures. After the implant is placed, connective tissue cells, such as fibroblasts, enter the implant

[5] **Bovine split hide**: a skin of a cow that has been sliced into thin layers.
[6] **Cerebral and Cerebellar**: both refer to parts of the brain, but they point to different regions, i.e., cerebral is the largest part of the brain, whereas cerebellar is located at the back of the brain, beneath the cerebrum (the largest part of the brain).
[7] **Resorbable**: means that material is gradually broken down and absorbed by the body over time, so it disappears naturally without needing to be removed.

and begin to grow and multiply within it. These cells gradually produce new tissue and replace the implant's collagen with the body's own connective tissue. This natural integration process, called revitalization, is usually completed within one to three months.

3.2 Information about medicinal substances in the device, if any

Lyoplant® and Lyoplant® Onlay do not contain any medicinal substances.

3.3 Description of how the device is achieving its intended mode of action

During surgery, the surgeon selects an implant of a suitable size to help close the opening in the protective covering (dura mater) of the brain or spinal cord.

Lyoplant® is trimmed by the surgeon to fit the surgical area and softened before placement. It is then stitched in place to help keep the implant securely positioned and to support a tight seal.

Lyoplant® Onlay is designed so that it can be placed over the opening without stitches in many cases. Its surface helps it stay in position when placed on the tissue. If needed, the surgeon can also secure it with stitches.

In some situations, the surgeon may apply an additional medical sealant to further support a tight closure.

3.4 Description of accessories, if any

Not applicable.

4 Risks and warnings

Contact your healthcare professional if you believe that you are experiencing side effects related to the device or its use or if you are concerned about risks. This document is not intended to replace a consultation with your healthcare professional if needed.

4.1 How potential risks have been controlled or managed

Potential risks have been identified and controlled according to *DIN EN ISO 14971 Medical devices - Application of risk management to medical devices.*

4.2 Remaining risks and undesirable effects

As with any surgical procedure and implanted medical devices, some risks and side effects may occur, although they are uncommon.

Possible complications when using Lyoplant® or Lyoplant® Onlay include:

- Leakage of cerebrospinal fluid (CSF), the clear fluid surrounding the brain and spinal cord
- Infection at the surgical site
- Adhesion, where the implant may stick to the brain forming scar tissue
- Allergic reactions, particularly in patients who are sensitive to material derived from cattle

Based on clinical studies, post-market follow-up, and reports from healthcare professional, these side effects occur rarely when the devices are used as intended. No consistent or unexpected safety concerns have been identified.

4.3 Warnings and precautions

- Lyoplant® and Lyoplant® Onlay are for use only in surgery by qualified healthcare professionals
- Patients with these implants can safely undergo magnetic resonance imaging (MRI) scans with magnetic field strength between 1.5 or 3.0 Tesla. The implants are made of non-metallic material and do not pose additional risk during MRI.

4.4 Summary of any field safety corrective action, (FSCA including FSN) if applicable

For Lyoplant® and Lyoplant® Onlay neither FSCA nor field safety notification (FSN) were required.

This means that no recalls, safety notifications, or changes to the use of the devices have been necessary based on their clinical use.

5 Summary of clinical evaluation and post-market clinical follow-up (PMCF)

5.1 Clinical background of the device

Lyoplant® and Lyoplant® Onlay are used in neurosurgery as a replacement for the dura mater, which is the tough, outermost layer of the protective covering of the brain and spinal cord, known collectively as the meninges. The meninges consist of three layers: the dura mater, the arachnoid, and the pia mater. Together, these layers form a protective envelope around the brain and spinal cord, known as the central nervous system.

One of the key roles of the meninges is to contain CSF - a clear, cushioning fluid that protects the brain and spinal cord from shocks and injury. CSF also helps regulate brain temperature and supports metabolic and chemical stability in the brain.

During neurosurgical procedures—such as the removal of brain tumors (like meningiomas or gliomas), craniectomy (a procedure in which part of the skull is removed), or surgeries for conditions like Chiari malformation[8] - surgeons often need to cut through the dura mater to access the brain. In some cases, the dura may be removed, shrink, or become damaged during the operation.

When the dura cannot be closed directly by stitching (sutures), a dural substitute like Lyoplant® and Lyoplant® Onlay are used to restore the barrier. This is crucial to prevent CSF leaks, which can lead to serious complications. These include the accumulation of fluid under the surgical site (peridural CSF collection), the formation of abnormal fluid pathways (fistulas), or infections such as meningitis[9], cerebritis (inflammation of the brain tissue), or even brain abscesses.

5.2 The clinical evidence for the CE-marking

The CE marking of Lyoplant® and Lyoplant® Onlay is supported by a combination of laboratory testing, clinical investigations, and experience of long-term clinical use in routine medical practice.

Clinical evidence includes data from clinical studies involving more than 300 patients, which show that the devices are effective in supporting the closure of the dura mater and in preventing CSF leak. These studies

[8] **Chiari Malformation**: a condition where part of the brain (the cerebellum) extends into the spinal canal, which can put pressure on the brain and spinal cord and disrupt the flow of spinal fluid.

[9] **Meningitis**: an infection or inflammation of the protective layers around the brain and spinal cord, which can cause headaches, fever, and stiffness.

Effective

also demonstrate that the implants integrate well with the surrounding tissue after surgery and can be handled reliably by surgeons in different neurosurgical procedures.

In addition to formal clinical studies, the clinical evidence is supported by independent expert reports describing extensive real-world experience with Lyoplant® and Lyoplant® Onlay across a wide range of neurosurgical indications, patient populations, and clinical settings. These reports support the performance, biocompatibility, and durability of the devices, with no early or late complications observed during the reported follow-up periods.

Feedback from healthcare professionals collected after the devices were placed on the market shows that product-related side effects or complications are rare, and no consistent safety concerns have been identified during routine clinical use.

Overall, the available clinical evidence supports that Lyoplant® and Lyoplant® Onlay perform as intended and meet the requirements for CE marking.

5.3 Safety

The safety and performance of Lyoplant® and Lyoplant® Onlay are evaluated through a benefit-risk assessment that considers their intended use in dural repair and the available clinical evidence. The manufacturer continuously collects and reviews information on safety and performance from several sources, including:

- clinical use of the devices,
- scientific and medical literature,
- feedback and complaints from healthcare professionals.

To date, no consistent safety issues or unexpected complications related to Lyoplant® or Lyoplant® Onlay have been identified. Potential risks associated with the use of the devices are known and are described in Section 4.2 of this SSCP.

Based on the available data, the benefits of using Lyoplant® and Lyoplant® Onlay outweigh the identified risks for their intended indications. The overall benefit-risk profile is considered acceptable, and the safety of the devices is confirmed through ongoing post-market surveillance activities.

6 Possible diagnostic or therapeutic alternatives

When considering alternative treatments, it is recommended to contact your healthcare professional who can consider your individual situation.

6.1 General description of therapeutic alternatives

Different types of dural substitutes are available for surgeons to use when closing defects in the protective membrane (dura) around the brain or spinal cord. These options mainly differ by the material they are made from:

- Autografts (from the patient's own body, such as fascia lata or pericranium) are effective and have a low risk of immune reaction. However, harvesting this tissue requires a second surgical site, which may increase surgical time and recovery risk. Also, autografts may not be sufficient for large defects.

- Allografts (from human donors) and xenografts are often easier to use and are less invasive. However, allografts can carry a rare risk of disease transmission, such as Creutzfeldt-Jakob disease[10], though this is now highly controlled.
- Xenografts (from animals such as pigs or cattle – like Lyoplant® and Lyoplant® Onlay), typically processed into collagen-rich sheets, support natural healing but may trigger a mild immune response in some cases.
- Synthetic grafts are made in controlled manufacturing environments and are always available. These non-absorbable materials offer high stability and consistency. While they are not absorbed by the body, they have shown very good results in clinical use.

Each material has specific benefits and limitations. The choice depends on the surgical situation, surgeon's preference, and patient condition.

7 Suggested training for users

Surgeons with required knowledge about the surgical technique and surgical training who are aware of the in vivo characteristics of the product, operating room personnel (set-up, handling, and functional check). No additional training is required.

[10] **Creutzfeldt-Jakob disease**: a rare, fatal brain disorder caused by abnormal proteins called prions. It leads to rapid brain damage, memory loss, and loss of coordination.

8 Literature Cited

1. Di Perna G, Penner F, Cofano F, Marco R de, Baldassarre BM, Portonero I et al. Skull base reconstruction: A question of flow? A critical analysis of 521 endoscopic endonasal surgeries. PLoS One. 2021;16(3):e0245119.

2. Cruz-Martínez R, Chavelas-Ochoa F, Martínez-Rodríguez M, Aguilar-Vidales K, Gámez-Varela A, Luna-García J et al. Open Fetal Microneurosurgery for Intrauterine Spina Bifida Repair. Fetal Diagn Ther. 2021;48(3):163–73.

3. Lönnemark O, Ryttlefors M, Sundblom J. Cranioplasty in Brain Tumor Surgery: A Single-Center Retrospective Study Investigating Cranioplasty Failure and Tumor Recurrence. World Neurosurg. 2023;170:e313-e323.

4. Pakzaban P. Technique for Mini-open Decompression of Chiari Type I Malformation in Adults. Oper Neurosurg (Hagerstown). 2017;13(4):465–70.

5. Diao L, VanDyke ME, Joice GA, Lewis ZB, Dropkin BM, Sanders SC et al. Penile Extra-Tunical Graft Reconstruction of Peyronie's Disease Concavity Deformities. Urology. 2021;158:237–42.

6. Perheentupa U, Kinnunen I, Grénman R, Aitasalo K, Mäkitie AA. Management and outcome of pediatric skull base fractures. International Journal of Pediatric Otorhinolaryngology. 2010;74(11):1245–50.

7. Al-Mashani. Modified Surgical Technique for Chiari Malformation. American Journal of Medical Case Reports. 2016;4(6):193–7.

8. Litvack ZN, West GA, Delashaw JB, Burchiel KJ, Anderson VC. Dural augmentation: part I-evaluation of collagen matrix allografts for dural defect after craniotomy. Clinical Neurosurgery. 2009;65(5):890-7; discussion 897.

9. Jo K, Joo WI, Yoo DS, Park H-K. Clinical Significance of Decompressive Craniectomy Surface Area and Side. J Korean Neurosurg Soc. 2021;64(2):261–70.

10. CRANIAL Consortium. CSF rhinorrhoea after endonasal intervention to the skull base (CRANIAL): A multicentre prospective observational study. Front Oncol. 2022;12:1049627.

11. Cena P, Raco I, Roccia F, Federica S, Dediol E, Kos B et al. An 11-year multicentric surgical experience on pediatric orbital floor trapdoor fracture: A World Oral Maxillofacial Trauma (WORMAT) project. Journal of Stomatology, Oral and Maxillofacial Surgery. 2025;126(1):102033.

12. Laun A, Tonn JC, Jerusalem C. Comparative study of lyophilized human dura mater and lyophilized bovine pericardium as dural substitutes in neurosurgery. Acta Neurochir (Wien). 1990;107(1-2):16–21.

13. Surico N, Ruspa G, Longo D, Salini A, Arnulfo A, Baj G. Abdominal Sacrocolpopexy with Collagen Biosynthetic Mesh: Analysis of 21 Cases. Journal of Gynecologic Surgery. 2002;18(2):45–8.

14. Rapani M, Rapani C, Ricci L. Schneider membrane thickness classification evaluated by cone-beam computed tomography and its importance in the predictability of perforation. Retrospective analysis of 200 patients. Br J Oral Maxillofac Surg. 2016;54(10):1106–10.

15. Wong S-T, Ho W-N, He Z, Yam K-Y. Epidural multi-slitted microporous non-absorbable patch in decompressive craniectomy to facilitate cranioplasty: a preliminary study. Br J Neurosurg. 2018;32(4):400–6.

16. Doan TL, Le LD. Efficacy of the Tent-Pole Technique in Horizontal Ridge Augmentation. Pesqui. Bras. Odontopediatria Clín. Integr. 2020;20.

17. Miller C, Weisbrod L, Beahm D, Chamoun R. Compartmentalization: An Open Technique for Frontal Sinus Repair and Preservation-Description of Technique and Early Case Series. J Neurol Surg B Skull Base. 2021;82(2):189–95.

18. Jo KW, Jung H-J, Yoo DS, Park H-K. Changes in Blood Pressure and Heart Rate during Decompressive Craniectomy. J Korean Neurosurg Soc. 2021;64(6):957–65.

19. Stenimahitis V, Fletcher-Sandersjöö A, Tatter C, Elmi-Terander A, Edström E. Long-term outcome following surgical treatment of posttraumatic tethered cord syndrome: a retrospective population-based cohort study. Spinal Cord. 2022.

20. Kristiansson H, Fletcher-Sandersjöö A, Cesarini K, Fransson M, Vlachogiannis P, Burström G et al. Dura Management Strategies in the Surgical Treatment of Adult Chiari Type I Malformation: A Retrospective, Multicenter, Population-Based Parallel Cohort Case Series. Oper Neurosurg (Hagerstown). 2022;23(4):304–11.

21. Im S-H, Yoo D-S, Park H-K. Proper Indication of Decompressive Craniectomy for the Patients with Massive Brain Edema after Intra-arterial Thrombectomy. J Korean Neurosurg Soc. 2024;67(2):227–36.

22. El-Hajj VG, Öhlén E, Sandvik U, Pettersson-Segerlind J, Atallah E, Jabbour P et al. Long-term outcomes following posterior fossa decompression in pediatric patients with Chiari malformation type 1, a population-based cohort study. Acta Neurochir. 2024;166(1):460.

Signatures

This document is signed electronically (see last page).

Revision history

No.	Type of Revision	Date	Revision validated by the Notified Body (NB)
1	Initial preparation of the SSCP	16.09.2021	N/A
2	Expansion of the SSCP to include the patient-specific part, due to the implementation of an im-plant card.	23.09.2021	N/A
3	Textual changes to assure consistency in CEP, CER, and IFU.	14.06.2022	N/A
4	Changes due to feedback from the notified body in the context of a certification according to the MDR 2017/745: - Textual changes in Part 1, Section 3.1 Description of the device - Update of Section 5.5. Ongoing or planned post-market clinical follow-up - Textual changes in Part 1, Chapter 8 Reference to any harmonized standards and CS applied	29.07.2022	N/A
5	Changes due to feedback from the notified body in the context of a certification according to the MDR 2017/745: - Textual changes in Part 1, Chapter 8 Reference to any harmonized standards and CS applied	19.09.2022	N/A
6	Changes due to feedback from the notified body in the context of a certification according to the MDR 2017/745: - update of the revision number on the title page, - textual changes in 1.6 Class of device, i.e., rule 8.2 was removed according to Annex VIII, chapter II, 3.5.	16.03.2023	Not yet validated by the NB.
7	Textual changes to ensure consistency with the information in the IFU and Product Description.	14.08.2024	Not yet validated by the NB.
8	Version 7.0 validated by the Notified Body (Validation Statement from 31.03.2025)	14.08.2024	Yes Validation language: English
9	Complete rework in the context of re-certification of Lyoplant® and Lyoplant® Onlay. The SSCP for Lyoplant® Onlay (BDoCS-AIM-067512) was integrated into this document. Description of the main changes: - Part 1 Section 4.2: addition of Table 4 with the quantitative data on side effects as per MDCG 2019-9 Rev 1.	See "Effective Date" on approved document	Not yet validated by the NB.

	- Part 1 Section 5.3: Literature on the product has been rewritten and updated with recent publications evaluated in CER. - Part 1 Section 5.4: addition of Sections 5.4.1 Clinical Benefit and 5.4.2 Benefit-risk assessment as per MDCG 2019-9 Rev 1. - Part 1 Chapter 8: List of harmonized standards and CS applied has been revised to align with the source document - List of Applied Standard Rev. 7.0, BDoCS-AIM-044391 (change to information on MDR Article 32.2e). - Part 2 has been rewritten to improve clarity and understanding for patients. No changes to information on MDR Article 32.2a and c have been made.		

Title: SSCP_Lyoplant_Lyoplant Onlay Initiator: Izabela ? Firkowska-Boden

This document is signed electronically in compliance with the B. Braun electronic signature policies and procedures by following persons:

UserName: Firkowska-Boden, Izabela (firkizde)
Title: Manager Medical Scientific Affairs
Date: Wednesday, 17 December 2025, 14:11 W. Europe Daylight Time
Meaning: Document signed as Author
==========

UserName: Weber, Tobias (webetode)
Title: Head of Clinical Evaluation and Clinical Studies NES/ROB/MIS/SGM
Date: Wednesday, 17 December 2025, 14:19 W. Europe Daylight Time
Meaning: Approve Document
==========